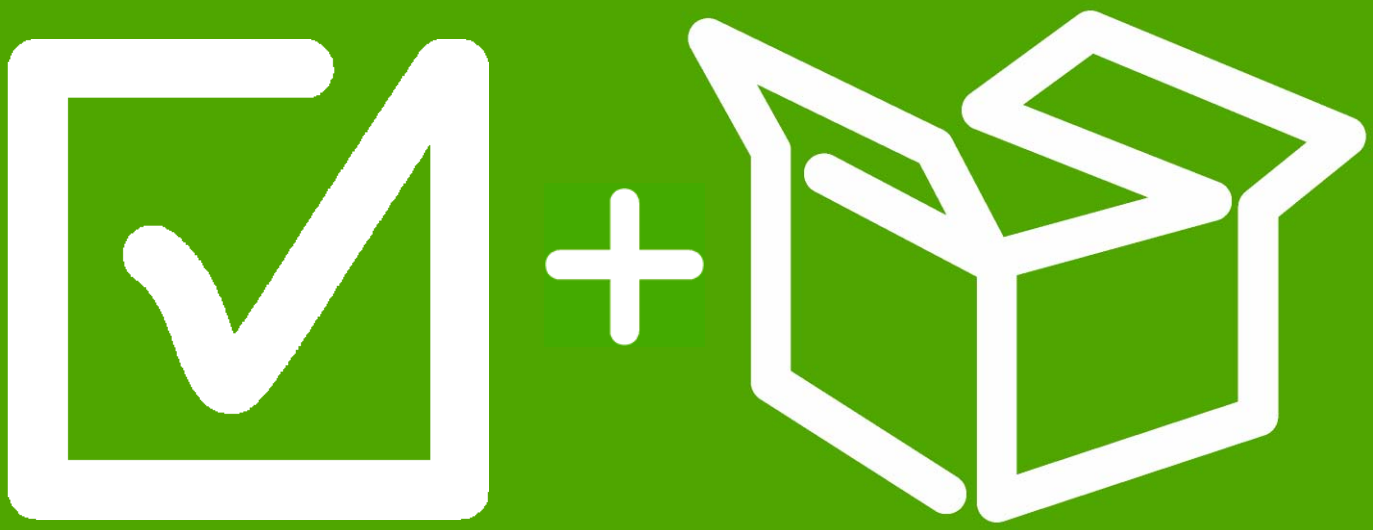
This document is based on European standards and is not valid for use in U.S.A.

Compact / CANmotion / Motion Controller / LMC058 + Performance Packaging

System User Guide



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Schneider Electric

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Important Information

NOTICE Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

DANGER indicates an imminently hazardous situation, which, if not avoided, **will result in** death or serious injury.

WARNING

WARNING indicates a potentially hazardous situation, which, if not avoided, **can result in** death, serious injury, or equipment damage.

CAUTION

CAUTION indicates a potentially hazardous situation, which, if not avoided, **can result in** injury or equipment damage.

PLEASE NOTE Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and the installation, and has received safety training to recognize and avoid the hazards involved

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Before You Begin

Do not use this product on machinery lacking effective point-of-operation guarding. Lack of effective point-of-operation guarding on a machine can result in serious injury to **the operator of that machine.**

⚠ WARNING

UNGUARDED MACHINERY CAN CAUSE SERIOUS INJURY

- Do not use this software and related automation products on equipment which does not have point-of-operation protection.
- Do not reach into machine during operation.

Failure to follow these instructions can cause death, serious injury or equipment damage.

This automation equipment and related software is used to control a variety of industrial processes. The type or model of automation equipment suitable for each application will vary depending on factors such as the control function required, degree of protection required, production methods, unusual conditions, government regulations, etc. In some applications, more than one processor may be required, as when backup redundancy is needed.

Only the user can be aware of all the conditions and factors present during setup, operation and maintenance of the machine; therefore, only the user can determine the automation equipment and the related safeties and interlocks which can be properly used. When selecting automation and control equipment and related software for a particular application, the user should refer to the applicable local and national standards and regulations. A "National Safety Council's" Accident Prevention Manual also provides much useful information.

In some applications, such as packaging machinery, additional operator protection such as point-of-operation guarding must be provided. This is necessary if the operator's hands and other parts of the body are free to enter the pinch points or other hazardous areas and serious injury can occur. Software products by itself cannot protect an operator from injury. For this reason the software cannot be substituted for or take the place of point-of-operation protection.

Ensure that appropriate safeties and mechanical/electrical interlocks for point-of-operation protection have been installed and are operational before placing the equipment into service. All mechanical/electrical interlocks and safeties for point-of-operation protection must be coordinated with the related automation equipment and software programming.

NOTE: Coordination of safeties and mechanical/electrical interlocks for point-of-operation protection is outside the scope of this document.

START UP AND TEST

Before using electrical control and automation equipment for regular operation after installation, the system should be given a start up test by qualified personnel to verify correct operation of the equipment. It is important that arrangements for such a check be made and that enough time is allowed to perform complete and satisfactory testing.

⚠ CAUTION

EQUIPMENT OPERATION HAZARD

- Verify that all installation and set up procedures have been completed.
- Before operational tests are performed, remove all blocks or other temporary holding means used for shipment from all component devices.
- Remove tools, meters and debris from equipment.

Failure to follow these instructions can result in injury or equipment damage.

Follow all start up tests recommended in the equipment documentation. Store all equipment documentation for future reference.

Software testing must be done in both simulated and real environments.

Verify that the completed system is free from all short circuits and grounds, except those grounds installed according to local regulations (according to the National Electrical Code in the U.S.A, for instance). If high-potential voltage testing is necessary, follow recommendations in equipment documentation to prevent accidental equipment damage.

Before energizing equipment:

- Remove tools, meters, and debris from equipment.
- Close the equipment enclosure door.
- Remove ground from incoming power lines.
- Perform all start-up tests recommended by the manufacturer.

OPERATION AND ADJUSTMENTS

The following precautions are from NEMA Standards Publication ICS 7.1-1995 (English version prevails):

- Regardless of the care exercised in the design and manufacture of equipment or in the selection and rating of components, there are hazards that can be encountered if such equipment is improperly operated.

- It is sometimes possible to misadjust the equipment and thus produce unsatisfactory or unsafe operation. Always use the manufacturer's instructions as a guide for functional adjustments. Personnel who have access to these adjustments should be familiar with the equipment manufacturer's instructions and the machinery used with the electrical equipment.

- Only those operational adjustments actually required by the operator should be accessible to the operator. Access to other controls should be restricted to prevent unauthorized changes in operating characteristics.

⚠ WARNING

UNEXPECTED EQUIPMENT OPERATION

- Only use software tools approved by Schneider Electric for use with this equipment.
- Update your application program every time you change the physical hardware configuration.

Failure to follow these instructions can cause death, serious injury or equipment damage.

Introduction

Introduction

This document is intended to provide a quick introduction to the described system. It is not intended to replace any specific product documentation, nor any of your own design documentation. On the contrary, it offers additional information to the product documentation, for installing, configuring and implementing the system.

The architecture described in this document is not a specific product in the normal commercial sense. It describes an example of how Schneider Electric and third-party components may be integrated to fulfill an industrial application.

A detailed functional description or the specification for a specific user application is not part of this document. Nevertheless, the document outlines some typical applications where the system might be implemented.

The architecture described in this document has been fully tested in our laboratories using all the specific references you will find in the component list near the end of this document. Of course, your specific application requirements may be different and will require additional and/or different components. In this case, you will have to adapt the information provided in this document to your particular needs. To do so, you will need to consult the specific product documentation of the components that you are substituting in this architecture. Pay particular attention in conforming to any safety information, different electrical requirements and normative standards that would apply to your adaptation.

It should be noted that there are some major components in the architecture described in this document that cannot be substituted without completely invalidating the architecture, descriptions, instructions, wiring diagrams and compatibility between the various software and hardware components specified herein. You must be aware of the consequences of component substitution in the architecture described in this document as substitutions may impair the compatibility and interoperability of software and hardware.

⚠ CAUTION

EQUIPMENT INCOMPATIBILITY OR INOPERABLE EQUIPMENT

Read and thoroughly understand all hardware and software documentation before attempting any component substitutions.

Failure to follow these instructions can result in injury or equipment damage.

This document describes a generic architecture based on Modicon LMC058 Motion controller S-Type and a packaging architecture based on Modicon LMC058 Motion controller S-Type.

Abbreviations

Abbreviation	Signification
AC	Alternating Current
CB	Circuit Breaker
CFC	Continuous Function Chart – a programming language based on function chart
DI	Digital Input
DO	Digital Output
DC	Direct Current
DFB	Derived Function Blocks
EDS	Electronic Data Sheet
E-STOP	Emergency Stop
FBD	Function Block Diagram – an IEC-61131 programming language
HMI	Human Machine Interface
I/O	Input/Output
IL	Instruction List - a textual IEC-61131 programming language
IP	Internet Protocol
LD	Ladder Diagram – a graphic IEC-61131 programming language
MFB	PLCopen Motion Function Block
PC	Personal Computer
POU	Programmable Object Unit, Program Section in SoMachine
PDO	Process Data Object (CANopen)
PS	Power Supply
RMS	Root Mean Square
RPM	Revolution Per Minute
RTU	Remote Terminal Unit
RPDO	Receive Process Data Object (CANopen)
SD	Stepper motor Drive
SE	Schneider Electric
SFC	Sequential Function Chart – an IEC-61131 programming language
SDO	Service Data Object
ST	Structured Text – an IEC-61131 programming language
TCP	Transmission Control Protocol
TPDO	Transmit Process Data Object (CANopen)
TVDA	Tested, Validated and Documented Architecture
VSD	Variable Speed Drive
WxHxD	Dimensions : Width, Height and Depth

Glossary

Expression	Signification
Advantys	SE product name for a family of I/O modules
Altivar (ATV)	SE product name for a family of VSDs
CANopen	Name for a communications machine bus system
CANmotion	Name for a communications motion bus system
ConneXium	SE product name for a Family of Transparent Factory devices
Harmony	SE product name for a family of switches and indicators
ILA, ILE	SE product name for a integrated drive Lexium
Lexium (LXM)	SE product name for a family of servo drives
Magelis	SE product name for a family of HMI-Devices
Modicon LMC058 Motion controller	SE product name for a motion controller
OsiSense	SE product name for a family of sensors
Phaseo	SE product name for a family of power supplies
PLCopen	An international standard for industrial controller programming.
Preventa	SE product name for a family of safety devices
SD3	SE product name for Lexium stepper motor drives SD3
SoMachine	SE product name for an integrated software tool
TeSys	SE product name for a family of motor protection devices and load contactors
Vijeo Designer	An SE software product for programming Magelis HMI devices

Application Source Code

Introduction

Examples of the source code and wiring diagrams used to attain the system function as described in this document can be downloaded from our website (registration is required, please contact your Schneider Electric Application Design Expert).

The example source code is in the form of configuration, application and import files. Use the appropriate software tool to either open or import the files.

Extension	File Type	Software Tool Required
CSV	Comma Separated Values, Spreadsheet	MS Excel
DOC	Document file	Microsoft Word
DWG	Project file	AutoCAD
EDS	Electronic Data Sheet – Device Definition	Industrial standard
PDF	Portable Document Format - document	Adobe Acrobat
PROJECT	Project file	SoMachine
VDZ	Project file	Vijeo Designer
Z13	Project archive file	EPLAN

Typical Applications

Introduction

Here you will find a list of the typical applications and market segments, where this system or subsystem can be applied:

Packaging

- Filling & closing machines
- Vertical bagging machines
- Boxing machines
- Carton closing / erecting machines
- Shrink wrapping machines
- Labeling machines
- Horizontal bagging machines
- Stretch wrapping machines

Textile

- Opening and closing machines
- Circular knitting machines
- Plucker machines
- Blending machines
- Carding machines
- Drawing frame machines
- Combing machines
- Ring Spinning machines
- Scouring Bleaching machines
- Jigger machines
- Shrink wrapping machines
- Beaming warping machines
- Sizing machines

System

Introduction

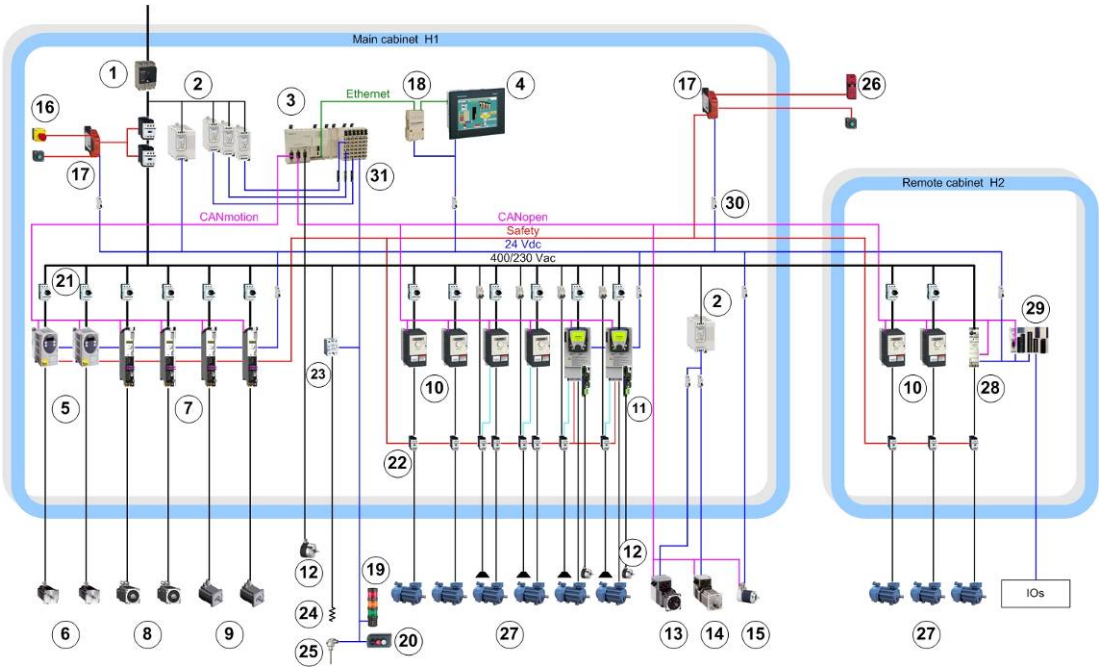
The system chapter describes the architecture, the dimensions, the quantities and different types of components used within this system.

Architecture

General

The controller in this application is a Modicon LMC058 Motion controller. The user controls the application using the Magelis HMI device. The Altivar variable speed drives, Lexium integrated drives and TeSysU motor starter connected to the controller via a CANopen fieldbus. The Lexium servo drives and Lexium stepper drives connected to the controller via a CANmotion bus. The example application includes two functional safety options according to EN ISO 13849-1 standards: an Emergency Stop function supervised by a Preventa safety module (see the appropriate hardware manual), plus a second Preventa safety module to evaluate protective door sensors

Layout



1. Compact NSX100F main switch
2. Phaseo power supply ABL8
3. Modicon LMC058 Motion controller
4. Magelis XBTGT HMI
5. Lexium SD328 stepper drive
6. Lexium stepper motor BRS
7. Lexium 32 servo drive
8. Lexium servo motor BSH
9. Lexium servo motor BMH
10. Altivar 312 variable speed drive
11. Altivar 71 variable speed drive + encoder card
12. Absolute encoder XCC
13. Lexium integrated drive ILA
14. Lexium integrated drive ILE
15. CANopen encoder XCC
16. Harmony E-stop enclosure XALK
17. Preventa Safety module XPS
18. ConneXium Ethernet switch
19. Harmony tower light XVBC
20. Harmony push buttons enclosure XALD
21. TeSys motor protection GV2L
22. TeSysD contactor LC1D
23. Crouzet solid state relay (4x)
24. Heating element (4x)
25. Thermocouple Pt100 (4x)
26. Preventa safety switch XCS
27. AC-motor
28. TeSysU motor starter with CANopen module
29. Advantys OTB I/O-island with extension module
30. Multi 9 circuit breaker
31. Slow blow fuse

Components

Hardware:

- Compact NSX100F main switch
- Phaseo power supply ABL8
- Modicon LMC058 Motion controller
- Magelis XBTGT HMI
- Lexium 32 servo drive with BSH/BMH servo motor
- Lexium SD3 stepper drive with BRS stepper motor
- Altivar 312 and Altivar 71 variable speed drive
- Lexium integrated drive ILA and ILE
- Advantys OTB island
- TeSysU motor starter
- OsiSense (Osicoder) encoder
- Harmony pushbuttons
- Preventa XPS safety module
- TeSys motor protection GV2L
- TeSysD contactors
- ConneXium Ethernet switch

Software:

- SoMachine V2.0
- IclA Easy

Quantities of Components

For a complete and detailed list of components, the quantities required and the order numbers, please refer to the components list at the rear of this document.

Degree of Protection

Not all the components in this configuration are designed to withstand the same environmental conditions. Some components may need additional protection, in the form of housings, depending on the environment in which you intend to use them. For environmental details of the individual components please refer to the list in the appendix of this document and the corresponding user manual.

Cabinet Technical Data

Input	Mains voltage	400 Vac
	Power requirement	~ 11 kW
	Cable size	5 x 2.5 mm² (L1, L2, L3, N, PE)
	Cable connection	3 phase + Neutral + Ground Neutral is needed for 230 Vac (Phase and Neutral)
Output	Motor power ratings	o 2 servo motors (BMH type with brake) controlled by LXM32 (continuous output current : 6 A RMS at 6000 RPM) o 2 servo motors (BSH type with brake) controlled by LXM32 (continuous output current : 6 A RMS at 6000 RPM) o 2 stepper motors (BRS type without brake) controlled by SD3 (max. nominal motor current: 2.5 A) o 1 integrated drives (brushless AC synchronous servo motor) controlled by ILA (max. continuous current input: 5 A) o 1 integrated drives (electronically commutated motor) controlled by ILE (max. continuous current input: 5 A) o 2 asynchronous motors controlled by ATV71 (0.75 kW) o 2 asynchronous motors controlled by ATV312 (0.75 kW) o 4 asynchronous motors controlled by ATV312 (0.37 kW) o 2 asynchronous motors controlled by ATV312 (0.75 kW) o 1 asynchronous motors controlled by TeSysU (1.5 kW)

Functional Safety Notice

(EN ISO 13849-1 EN IEC 62061)

The standard and level of functional safety you apply to your application is determined by your system design and the overall extent to which your system may be a hazard to people and machinery.

As there are no moving mechanical parts in this application example, category 1 (according to EN ISO 13849-1) has been selected as an optional safety level.

Whether or not this functional safety category should be applied to your system should be ascertained with a proper risk analysis.

This document is not comprehensive for any systems using the given architecture and does not absolve users of their duty to uphold the functional safety requirements with respect to the equipment used in their systems or of compliance with either national or international safety laws and regulations

Emergency Stop

Emergency Stop/Emergency Disconnection function

This function for stopping in an emergency is a protective measure which compliments the safety functions for the safeguarding of hazardous zones according to prEN ISO 12100-2.

Safety Function

Door guarding

up to Performance Level (PL) = b, Category 1, Safety Integrity Level (SIL) = 1

Dimensions

The dimensions of the individual devices used; controller, drives, power supply, etc. require a main cabinet size of at least 1200 x 1800 x 600 mm (WxHxD) and a remote cabinets with the size of 600 x 800 x 400 mm (WxHxD).

The HMI display, illuminated indicators such as “SYSTEM ON“, “SYSTEM OFF“ or “ACKNOWLEDGE EMERGENCY STOP“ as well as the Emergency Stop switch itself, can be built into the door of the cabinet.

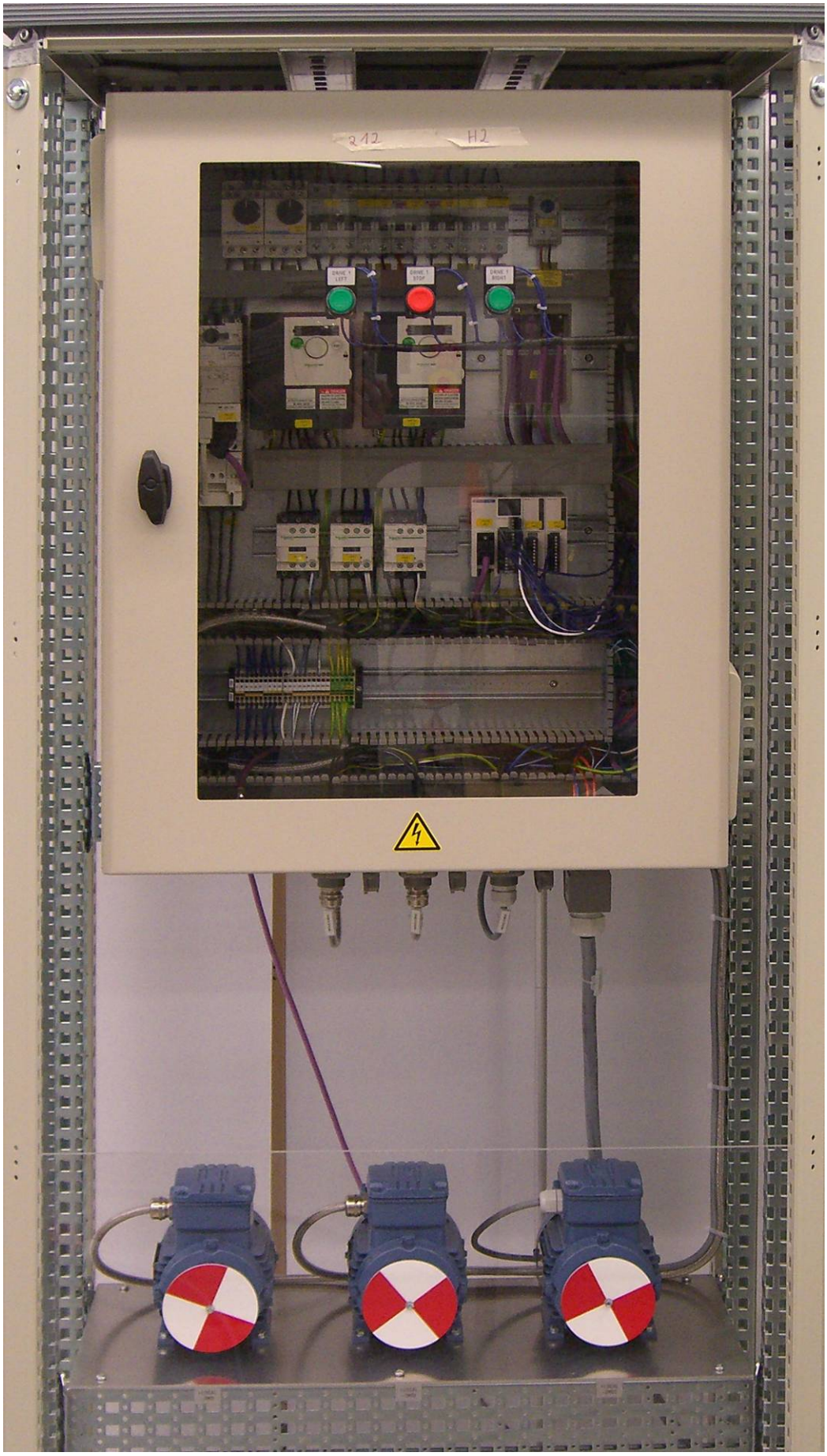
Installation

Introduction

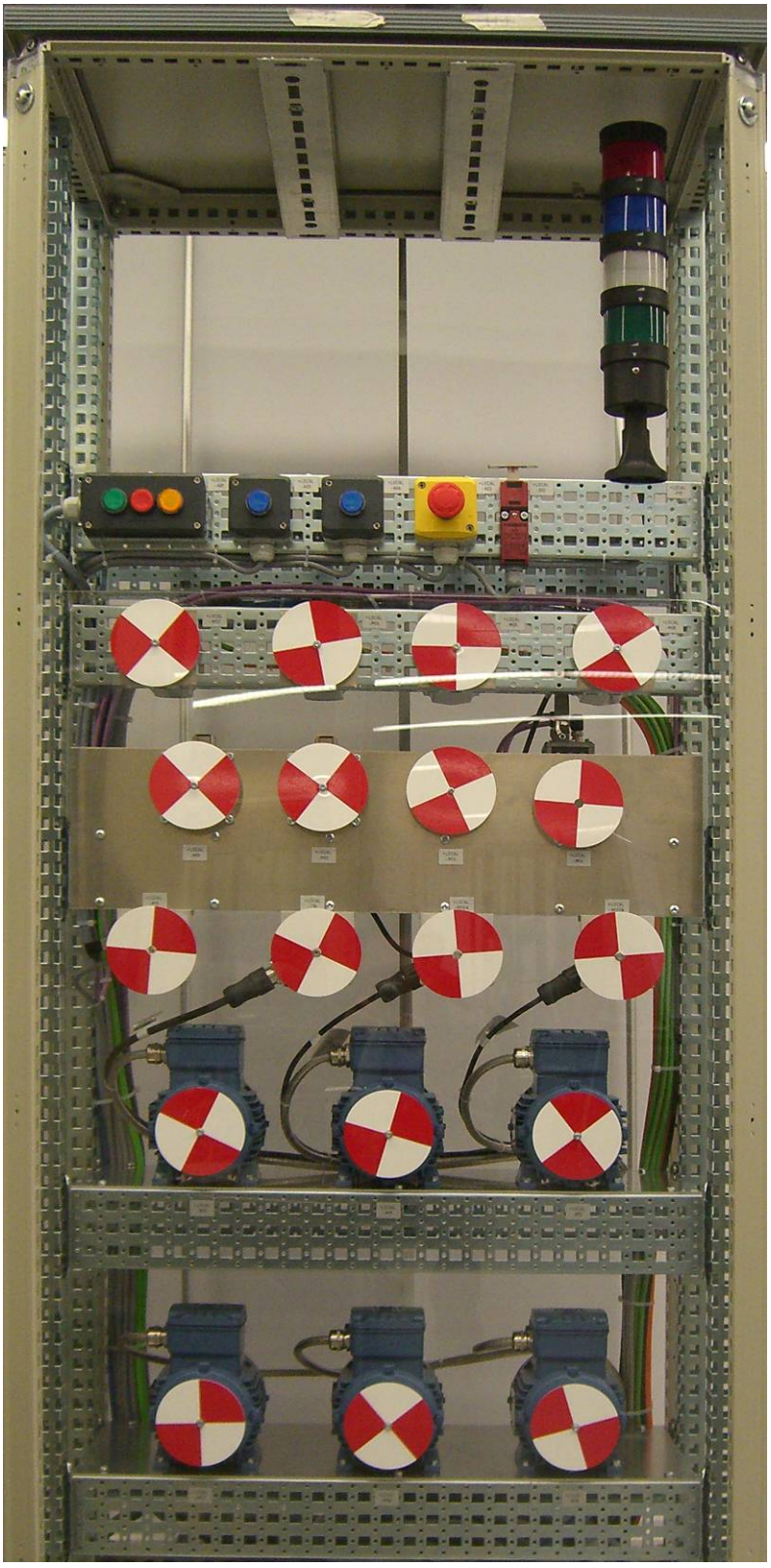
This chapter describes the steps necessary to set up the hardware and configure the software required to fulfill the described function of the application.

Assembly

Main cabinet front

Remote cabinet front	

Remote cabinet interior	

Field devices and motors of main cabinet	

Notes

The components designed for installation in a cabinet, i.e. the controller, safety modules, circuit breakers, contactors, motor circuit breakers, power supply, TeSysU motor starter and Adantys OTB I/O modules can be mounted on a 35 mm DIN rail.

The Magelis XBTGT HMI is mounted on the cabinet's door.

Main switch, solid state relay, Lexium 32A servo drives, Lexium SD3 stepper drives and Altivar variable speed drives are screwed directly onto the mounting plate. Alternatively the Altivar 312 and Lexium SD3 can be mounted on a DIN rail, if an adapter is used.

The ILA and ILE integrated drives Lexium and the OsiSense (Osicoder) CANopen encoder are installed in the field.

The Emergency Stop button, the door guard switches and the pushbutton housing for the display and acknowledgement indicators are designed for on-wall mounting in the field. All switches (except the door guard switch) can also be installed directly in a control cabinet (e.g., in a cabinet door) without special housings.

There are two options for installing XB5 pushbuttons or indicator lamps: These pushbuttons or switches can be installed either in a 22 mm hole, e.g., drilled into the front door of the control cabinet, or in an XALD-type housing suitable for up to 5 pushbuttons or indicator lamps.
The XALD pushbutton housing is designed for backplane assembly or direct wall mounting

400 Vac 3-phase wiring for the main circuit breaker, drives, stepper drives, motor starter and motors.

230 Vac 1-phase wiring between the main circuit breaker and Lexium drives.

230 Vac 1-phase wiring between the main circuit breaker and primary side of the 24 Vdc power supply.

24 Vdc wiring for control circuits and the controller power supply, I/O modules, HMI and integrated drives Lexium.

The individual components must be interconnected in accordance with the detailed circuit diagram in order to ensure that they function correctly.

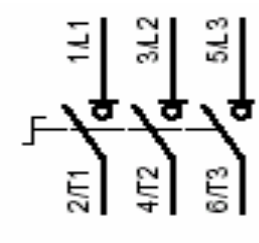
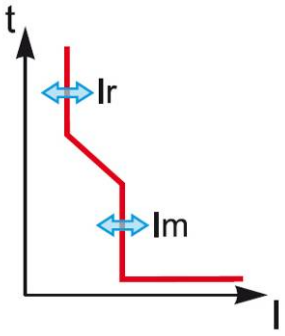
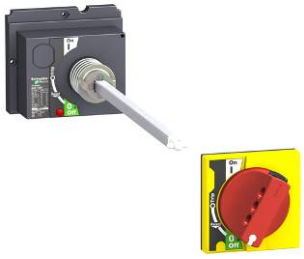
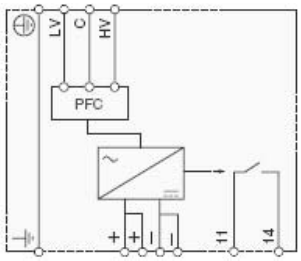
CANopen cables are installed for the communications link between the controller and the, Lexium 32A, Lexium SD3, Altivar 71, Altivar 312, TeSysU, ILA & ILE integrated Lexium dives, OsiSense (Osicoder) and Advantys OTB I/O modules.

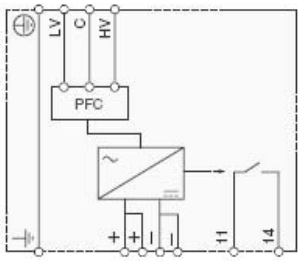
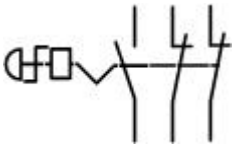
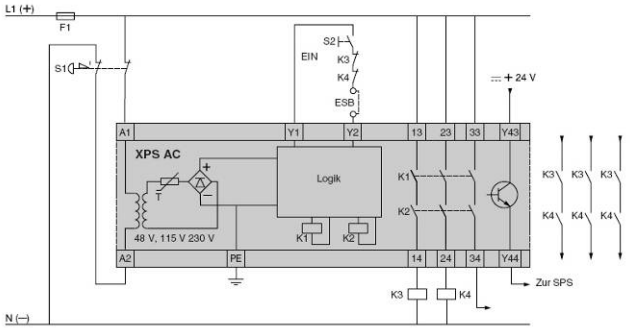
Ethernet cables are installed for the communications link between the controller and the HMI.

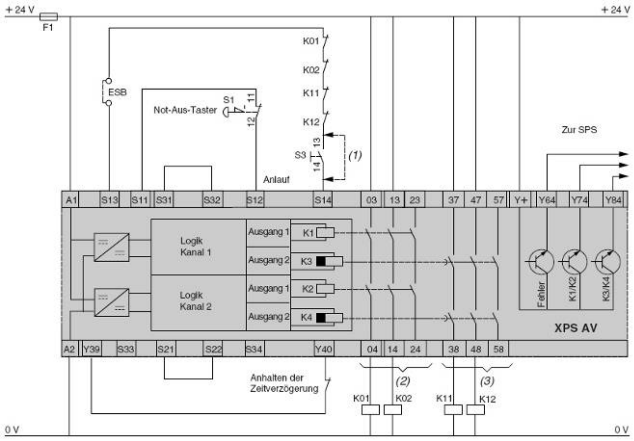
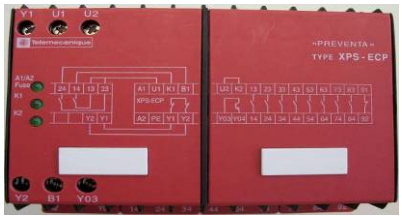
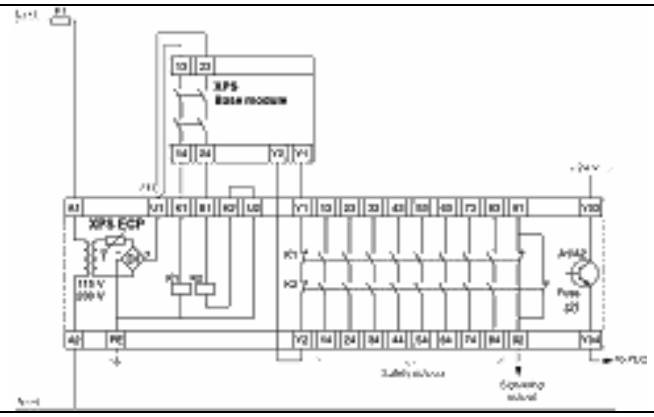
Hardware

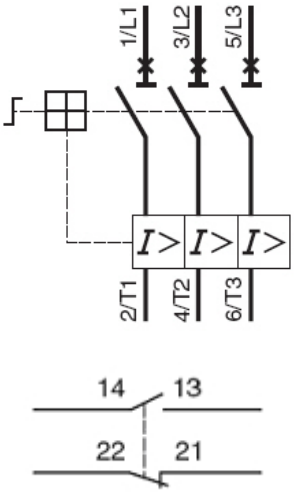
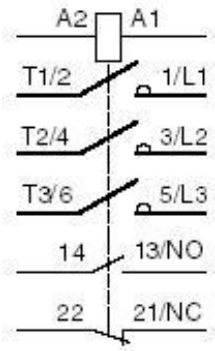
General

General description of the hardware.

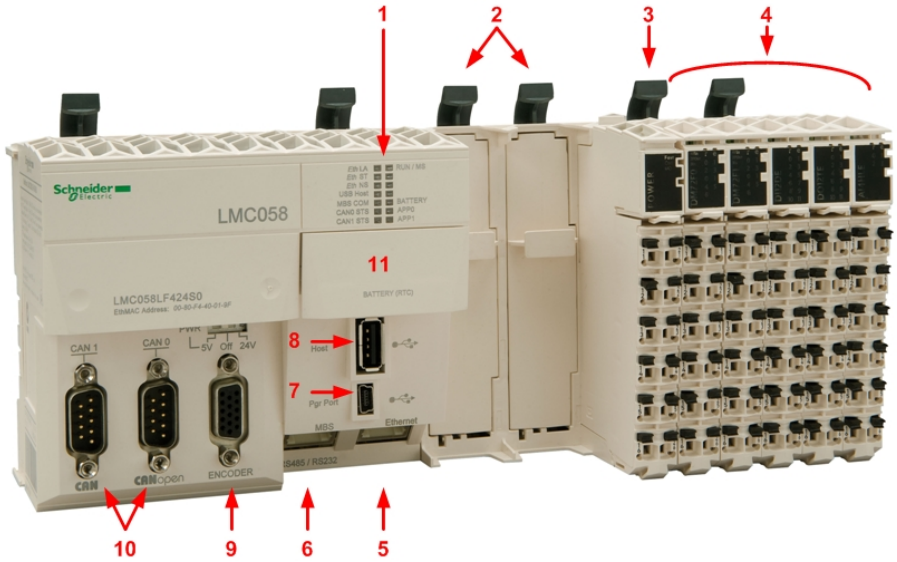
Mains Switch **Compact NSX100F** **LV429003** **36 kA 380/415 Vac**		
Mains Switch **Compact NSX100F** **LV429035** Trip unit TM32D Thermal-magnetic 32 A		 Ir - Thermal protection Im - Magnetic protection
Mains Switch **Compact NSX100F** **Rotary handle LV429340** **Terminal shield LV429515**	 Rotary handle with red handle on yellow front	 Terminal shield short
Power supply **Phaseo** **ABL8RPS24100** 24 Vdc, 10 A		

Power supply **Phaseo** **ABL8RPS24050** 24 Vdc, 5 A		
Harmony **Emergency Stop** **switch** (trigger action) **XALK178G**		
Safety Module **Preventa** **XPSAC5121**	 	

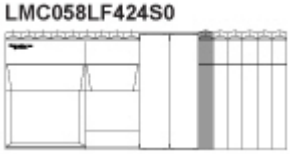
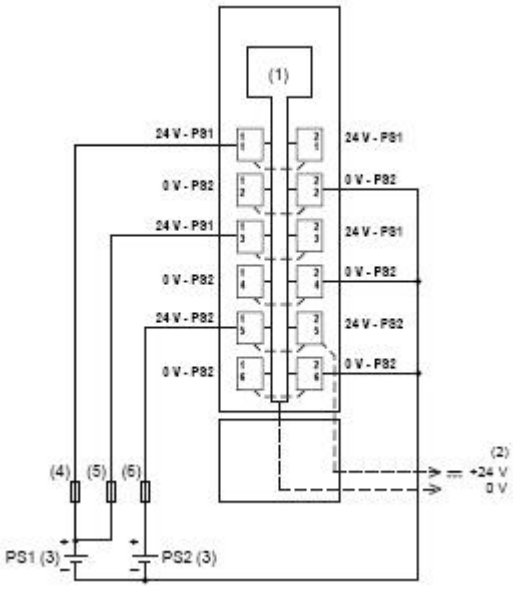
Safety Module **Preventa** **XPSAV11113Z002**	 
Safety Module **Preventa** **XPSECP5131** **Expansion Module**	 

Motor Circuit Breaker **GV2L08** **and** **GV2L14** with auxiliary contact **GVAE11**		 **GVAE11**
Contactor **TeSysD** **LC1D18BL**		

Modicon LMC058 Motion Controller **LMC058LF424S0**	1. Status LEDs 2. IF slots (not used in this architecture) 3. Power supply 4. Internal I/O area 5. RS485 port 6. Ethernet port 7. Mini BUSB port 8. USB A port 9. Encoder connector 10. CANopen and CANmotion ports 11. Battery area



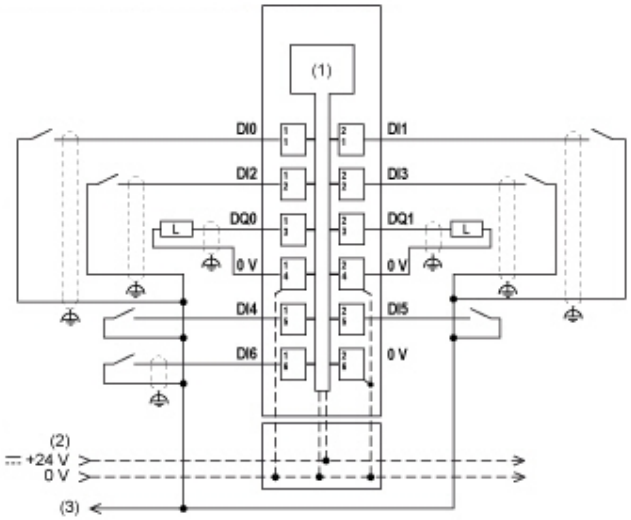
CPU, Ethernet, RS484, mini USB B, USB A, CANopen, CANmotion, Encoder	IF slot 0	IF slot 1	Power supply TM5S PS	Fast IO card 0	Fast IO card 1	12 digital inputs TM5S DI12D	12 digital outputs TM5S DO12T	4 analog inputs TM5S AI4HL

Modicon LMC058 Motion Controller embedded power supply	LMC058LF424S0   1. Internal electronics 2. 24 Vdc I/O power segment integrated into the bus bases 3. PS1/PS2: External isolated power supply 24 Vdc limited to 200 VA for UL508 conformance, or limited to 150 VA for CSA 22.2, N° 142 conformance 4. External fuse type T slow-blow 3 A 250 V 5. External fuse type T slow-blow 1 A 250 V 6. External fuse type T slow-blow 6.3 A 250 V

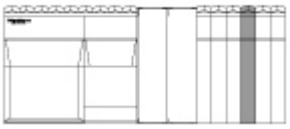
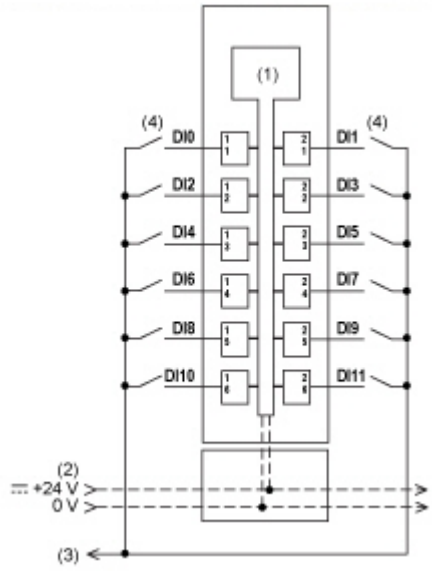
Modicon LMC058
Motion Controller

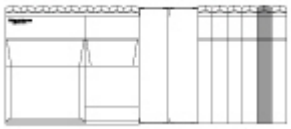
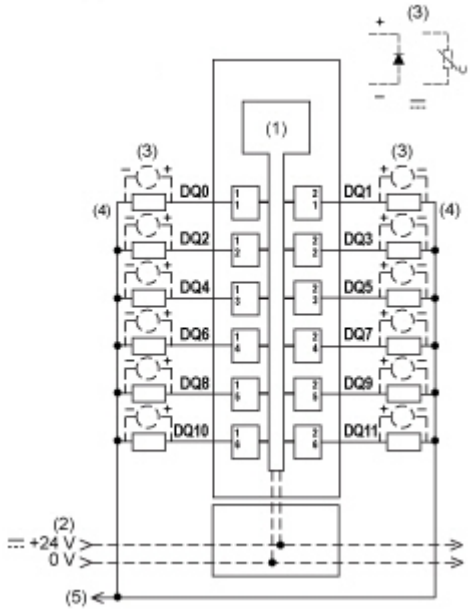
embedded
fast I/O's

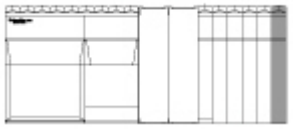
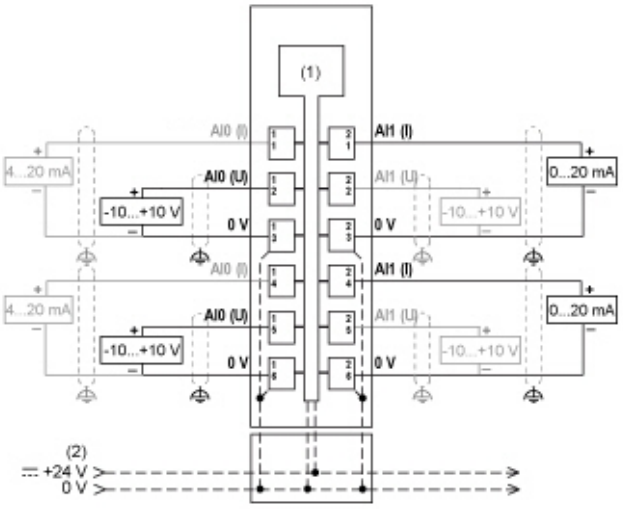
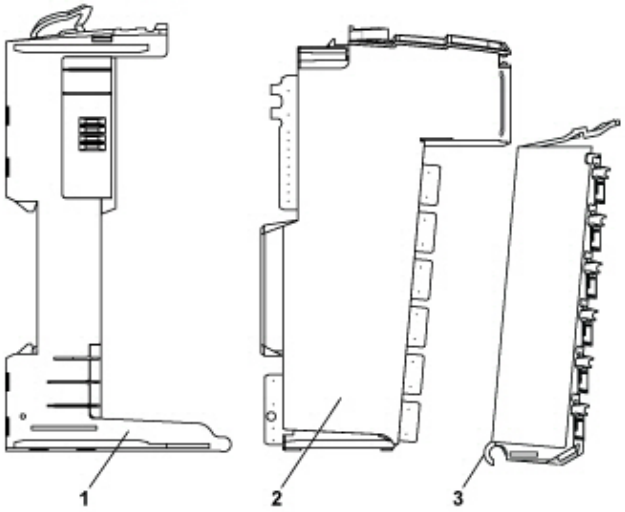
LMC058LF424S0



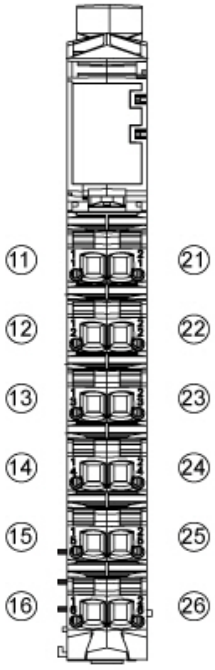
1. Internal electronics
2. 24 Vdc I/O power segment integrated into the bus bases
3. 24 Vdc Embedded expert modules power by external connection

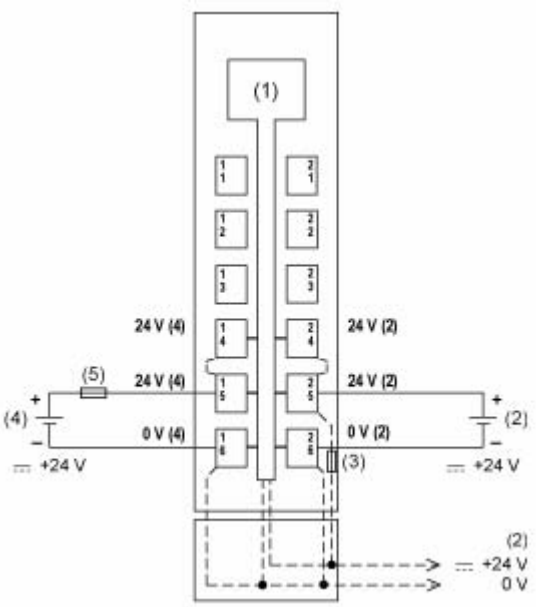
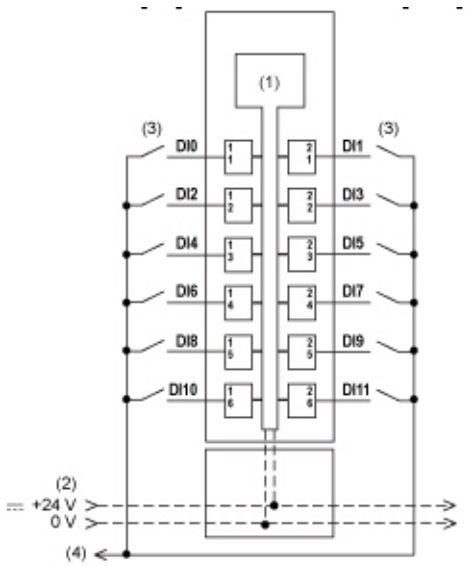
Modicon LMC058 **Motion Controller** embedded 12 Digital Inputs	LMC058LF424S0   1. Internal electronics 2. 24 Vdc I/O power segment integrated into the bus bases 3. 24 Vdc I/O power segment by external connection 4. 2-wire sensor

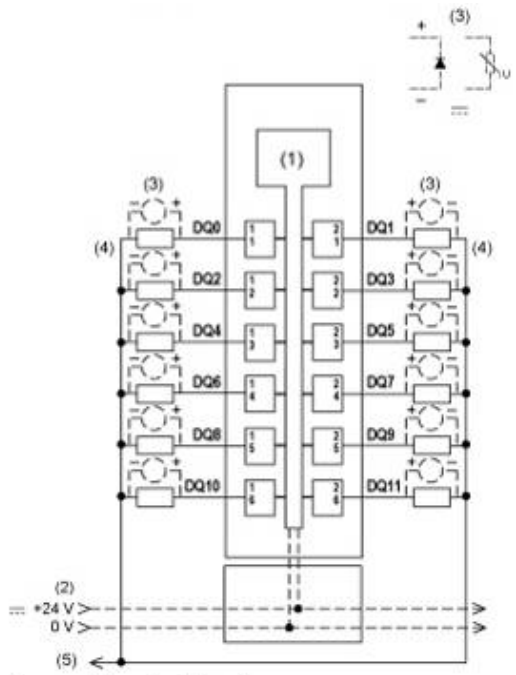
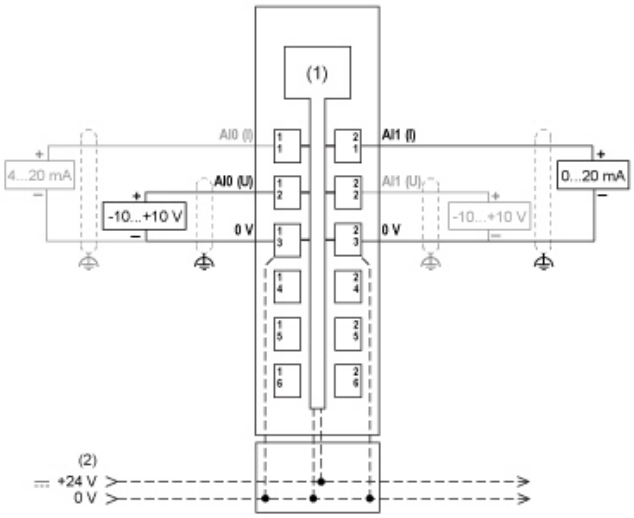
Modicon LMC058 **Motion Controller** embedded 12 Digital Outputs	LMC058LF424S0   1. Internal electronics 2. 24 Vdc I/O power segment integrated into the bus bases 3. Inductive load protection 4. 2-wire load 5. 0 Vdc I/O power segment by external connection

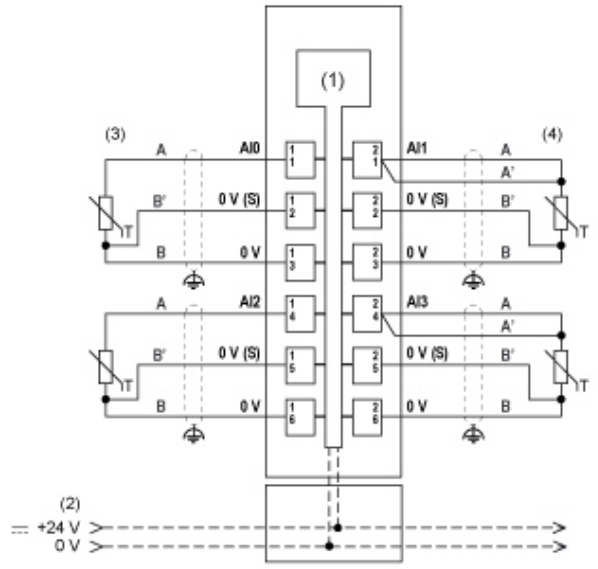
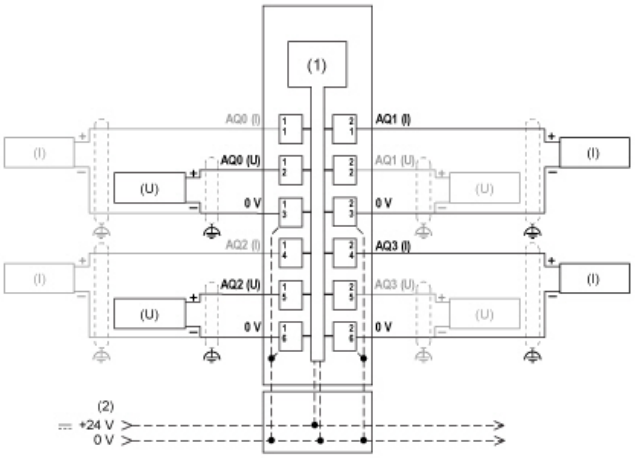
Modicon LMC058 Motion Controller embedded 4 Analog Inputs	LMC058LF424S0   1. Internal electronics 2. 24 Vdc I/O power segment integrated into the bus bases I Current U Voltage
Modicon LMC058 Motion Controller **Expansion module** **elements**	 1. Bus base 2. Electronic module 3. Terminal block

Modicon LMC058 **Motion Controller** **Bus base for** **electronic module** **TM5ACBM11** **and for additional** **power supply** **TM5ACBM01R** left side isolated	
Modicon LMC058 **Motion Controller** **Electronic module**	

Modicon LMC058 Motion Controller **Terminal block** **TM5ACTB12**		 pin assignment
Modicon LMC058 Motion Controller **Bus Base Locking** **Plate Right** **TM5ACLPR1**		

Modicon LMC058 Motion Controller **Expansion module** **TM5SPS2F** **power supply**	 1. Internal electronics 2. 24 Vdc I/O power segment integrated into the bus bases 3. Integrated fuse type T slow-blow 6.3 A 250 V exchangeable 4. 24 Vdc Main power 5. External fuse type T slow-blow 1 A 250 V Note: External isolated power supply 24 Vdc limited to 200 VA for UL508 conformance, or limited to 150 VA for CSA 22.2, N° 142 conformance.
Modicon LMC058 Motion Controller **Expansion module** **TM5SDI12D** with 12 Digital Inputs	 **1** Internal electronics **2** 24 Vdc I/O power segment integrated into the bus bases **3** 2 wire-sensor **4** 24 Vdc I/O power segment by external connection

Modicon LMC058 Motion Controller **Expansion module** **TM5SDO12T** with 12 digital outputs	 **1** Internal electronics **2** 24 Vdc I/O power segment integrated into the bus bases **3** Inductive load protection **4** 1-wire load **5** 0 Vdc I/O power segment by external connection
Modicon LMC058 Motion Controller **Expansion module** **TM5SAI2L** with 2 Analog Inputs	 **1** Internal electronics **2** 24 Vdc I/O power segment integrated into the bus bases **I** Current **U** Voltage

Modicon LMC058 Motion Controller **Expansion module** **TM5SAI4PH** with 4 Analog Inputs (Pt100)	 **1** Internal electronics **2** 24 Vdc I/O power segment integrated into the bus bases **3** 3-wire sensor **4** 4-wire sensor
Modicon LMC058 Motion Controller **Expansion module** **TM5SAO4L** with 4 Analog Outputs	 **1** Internal electronics **2** 24 Vdc I/O power segment integrated into the bus bases **I** Current **U** Voltage

Servo Drive

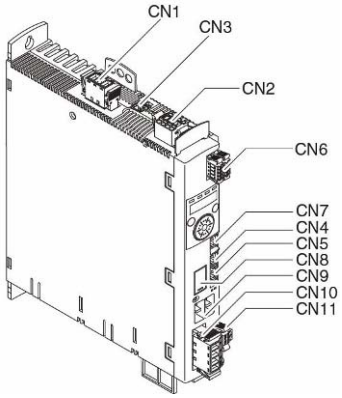
Lexium32

LXM32AD18M2

1-phase

230 Vac,

continuous output current 6 A RMS at 6000 RPM



Connection	Assignment
CN1	Power stage supply voltage
CN2	24 controller supply voltage and STO safety function
CN3	Motor encoder (encoder 1)
CN4	PTO (encoder simulation ESIM)
CN5	PTI (pulse/direction, A/B, CW/CCW)
CN6	Analog inputs and digital inputs/outputs
CN7	Modbus (commissioning interface)
CN8	External braking resistor
CN9	DC bus connection for parallel operation
CN10	Motor phases
CN11	Holding brake

Servo Drive

Lexium32

LXM32AD18M2

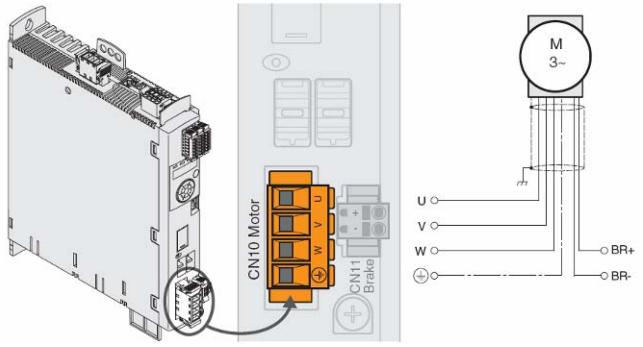
Embedded Human Machine Interface

Servo Drive

Lexium32

LXM32AD18M2

Wiring diagram
Power cable connection to motor (Length 5 m)



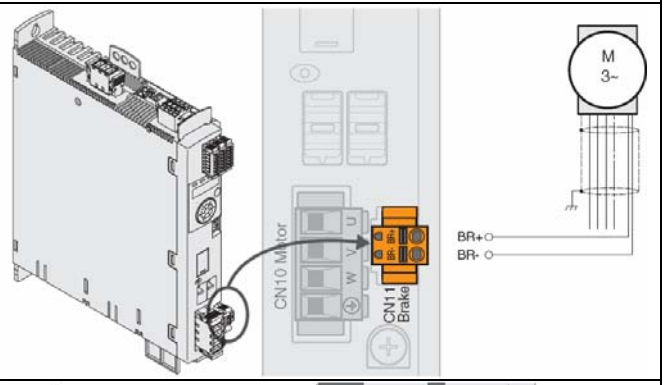
Connection	Meaning	Color
U	Motor phase	Black L1 (BK)
V	Motor phase	Black L2 (BK)
W	Motor phase	Black L3 (BK)
PE	Protective ground conductor	Green/yellow (GN/YE)
BR+	Holding brake +	White (WH)
BR-	Holding brake -	Gray (GR)

Servo Drive

Lexium32

LXM32AD18M2

Wiring diagram holding brake

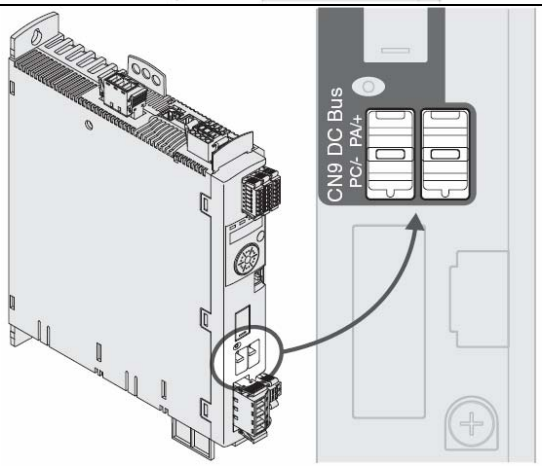


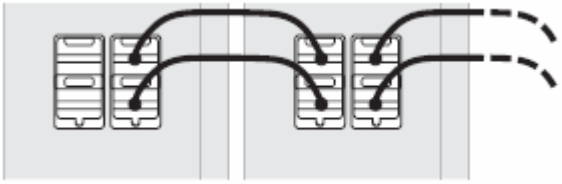
Servo Drive

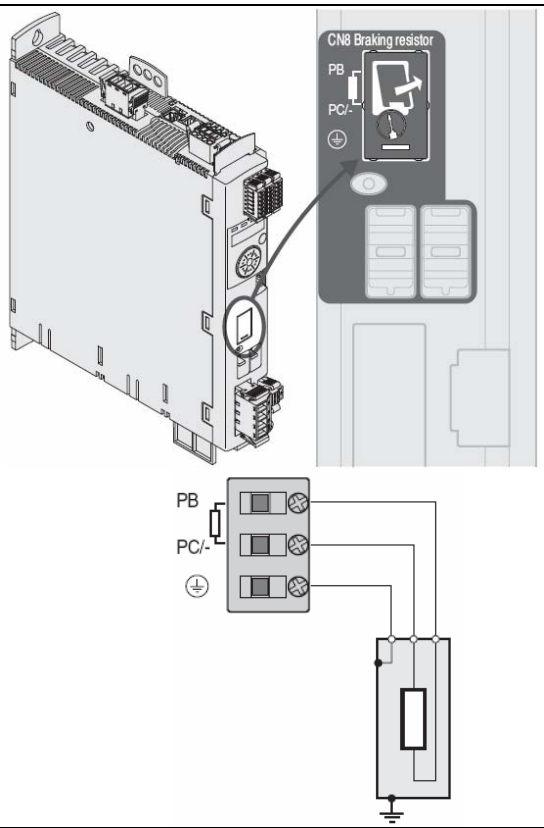
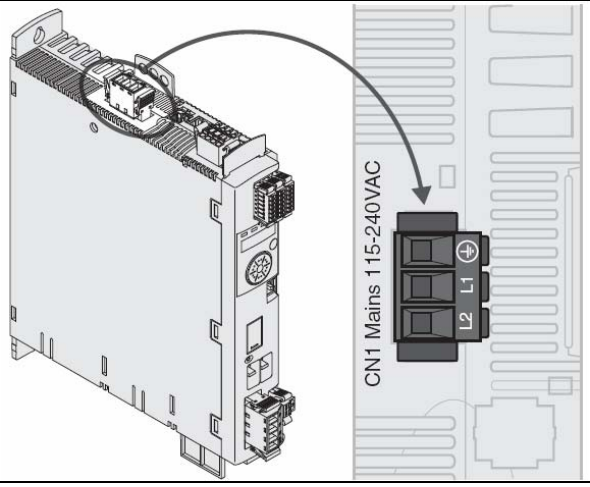
Lexium32

LXM32AD18M2

Parallel connection DC bus





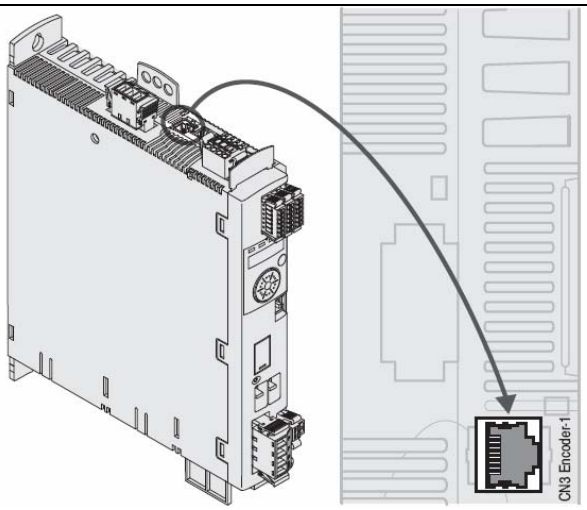
Servo Drive **Lexium32** **LXM32AD18M2** Connecting the external braking resistor	
Servo Drive **Lexium32** **LXM32AD18M2** 1-phase 115-240 Vac Wiring diagram power stage supply voltage for 1-phase device	

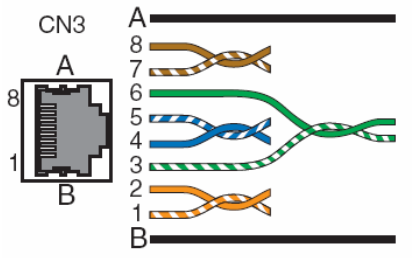
Servo Drive

Lexium32

LXM32AD18M2

Wiring diagram motor encoder





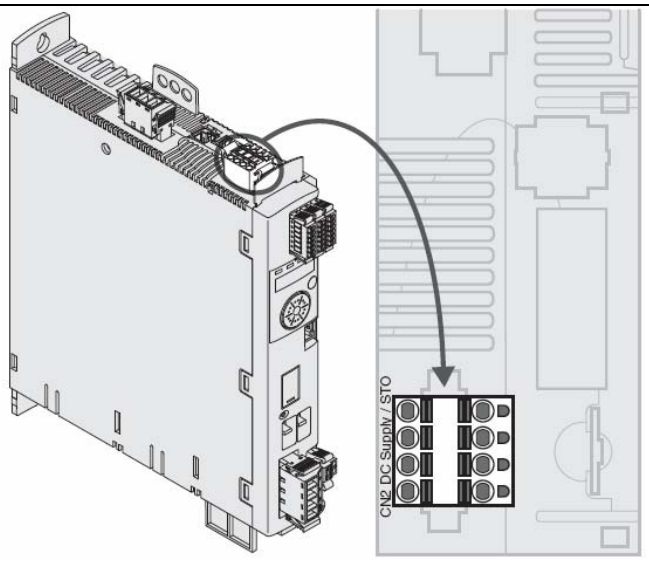
Pin	Signal	Motor, pin	Pair	Meaning	I/O
1	COS+	9	2	Cosine signal	I
2	REFCOS	5	2	Reference for cosine signal	I
3	SIN+	8	3	Sine signal	I
6	REFSIN	4	3	Reference for sine signal	I
4	Data	6	1	Receive data, transmit data	I/O
5	$\overline{\text{Data}}$	7	1	Receive data and transmit data, inverted	I/O
7	reserved		4	Not assigned	
8	reserved		4	Not assigned	
A	ENC+10V_OUT	10	5	Encoder supply	O
B	ENC_0V	11	5	Reference potential for encoder supply	
	SHLD			Shield	

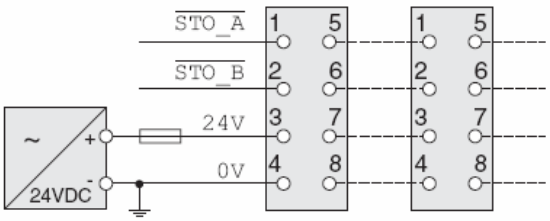
Servo Drive

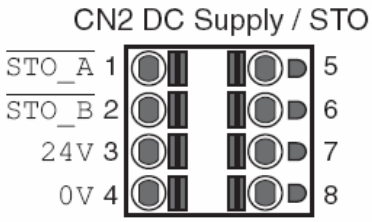
Lexium32

LXM32AD18M2

Wiring diagram controller supply voltage







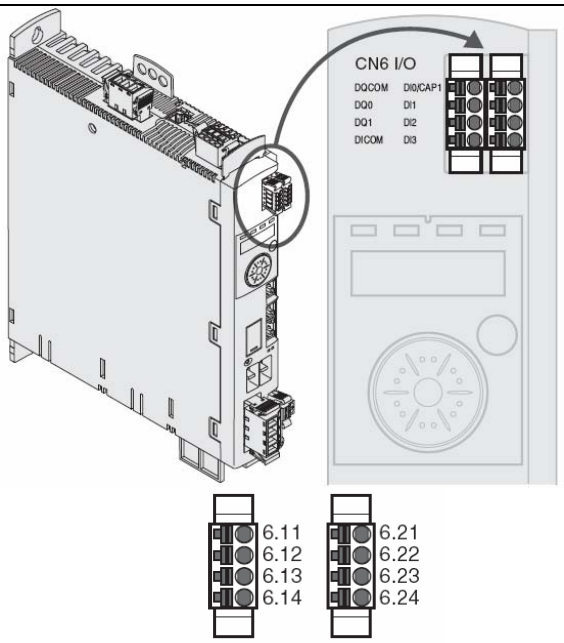
Pin	Signal	Meaning
1, 5	STO_A	Safety function STO: Dual-channel connection, connection A
2, 6	STO_B	Safety function STO: Dual-channel connection, connection B
3, 7	+24VDC	24 V controller supply voltage
4, 8	0VDC	Reference potential for 24 V controller supply voltage; Reference potential for STO

Servo Drive

Lexium32

LXM32AD18M2

Wiring diagram, digital inputs/outputs



Pin	Signal	1)	Meaning	I/O
CN6.11	DQ_COM		Reference potential digital outputs	
CN6.12	DQ0	X	Digital output 0	O (24 V)
CN6.13	DQ1	X	Digital output 1	O (24 V)
CN6.14	DI_COM		Reference potential digital inputs	

1) Connector coding, X=coding

Pin	Signal	1)	Meaning	I/O
CN6.21	DI0 / CAP1	X	Digital input 0 / touch probe 0	I (24 V)
CN6.22	DI1		Digital input 1	I (24 V)
CN6.23	DI2		Digital input 2	I (24 V)
CN6.24	DI3	X	Digital input 3	I (24 V)
	DI_COM		Reference potential digital inputs: CN6.14	

1) Connector coding, X=coding

Servo Motor for Lexium32

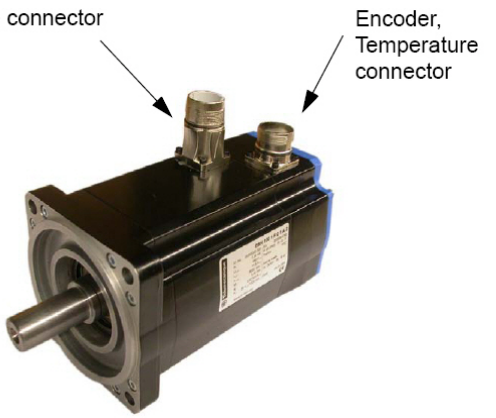
BMH0702T02F2A

with brake

Servo Motor for Lexium32

BSH0702P02F2A

with brake



Lexium SD3 Stepper motor drive

SD328AU25S2

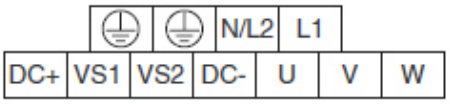
1-phase
115/230 Vac, 2.5 A

Lexium SD3 Stepper motor drive

SD328AU25S2

Power connection

230V



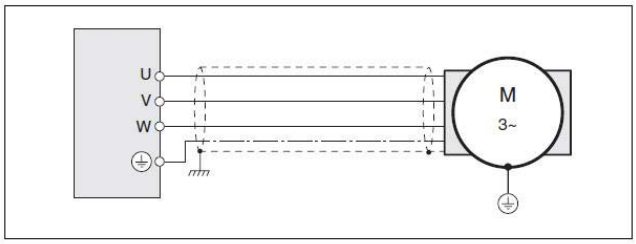
Power connections	Meaning
PE	Ground connection (protective earth)
L1, N/L2	Mains connection
DC+, DC-	DC bus
VS1, VS2	Setting the voltage range
U, V, W	Motor connections

Lexium SD3
Stepper motor drive

SD328 AU25S2

Power cable connection to motor (Length 5 m)

VW3S5101R50



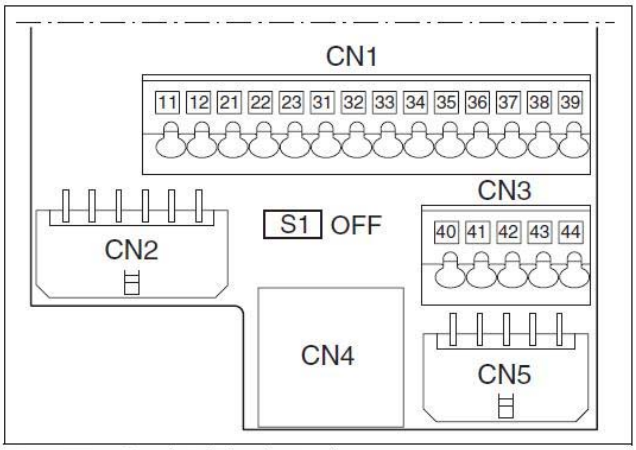
Connection	Meaning	Color [1]
U	Motor lead	brown (BN)
V	Motor lead	blue (BU)
W	Motor lead	black (BK)
PE	Protective conductor	green/yellow (GN/YE)

1) Color specifications refer to the cables available as accessories

Lexium SD3
Stepper motor drive

SD328 AU25S2

Signal connections



Overview of signal connections

Connection/ switch	Assignment
CN1	Analog input ±10V, pin 11-12
CN1	CANopen, pin 21-23
CN1	Digital inputs/outputs, pin 31-39
CN2	motor encoder
CN3	holding brake connection, pin 40-41
CN3	24V PELV controller supply voltage, pins 41-44
CN4	PC, remote terminal, Modbus, CANopen; (RJ45)
CN5	PULSE/DIR in, encoder signals A/B/I in [1]
S1	Switch for fieldbus terminating resistor

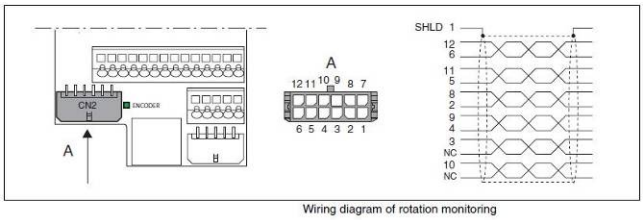
1) depending on "First Setup"

Lexium SD3
Stepper motor drive

SD328 AU25S2

Encoder connection via cable (Length 5 m)

VW3S8101R50



Wiring diagram of rotation monitoring

Pin	Signal	Motor, pin	Color [1]	Pair	Meaning	I/O
12	ENC_A	1	White	1	Encoder signal channel A	I
6	$\overline{\text{ENC\_A}}$	2	Brown	1	Encoder signal channel A, inverted	I
11	ENC_B	3	Green	2	Encoder signal channel B	I
5	$\overline{\text{ENC\_B}}$	4	Yellow	2	Encoder signal channel B, inverted	I
10	ENC_0V_OUT	7	Blue	3	Reference potential to ENC+5V_OUT [2]	O
4	ENC+5V_OUT	8	Red	3	5 V_{DC} power supply for encoder, max. 100 mA [2]	O
9	ENC_0V_SENSE	9	Black	4	Reference potential to ENC+5V_SENSE [2]	I
3	ENC+5V_SENSE	10	Violet	4	SENSE line to ENC+5V_OUT [2]	I
8	ENC_I	5	Gray	5	Encoder signal index pulse	I
2	$\overline{\text{ENC\_I}}$	6	Pink	5	Encoder signal index pulse, inverted	I
7	$\overline{\text{T\_MOT}}$	11	Gray/pink		temperature sensor PTC	I
1	SHLD				Shielding braid	

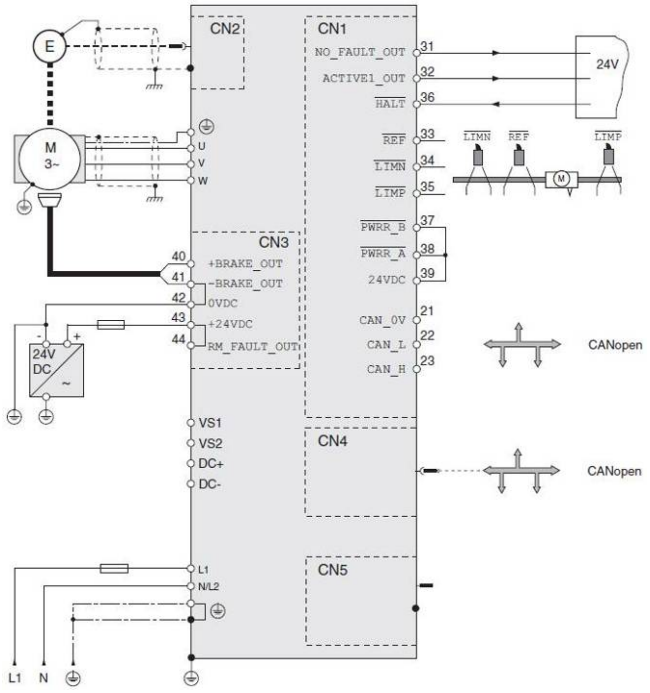
1) Color specifications refer to the cables available as accessories
2) At the end of the motor encoder cable (motor side), the signal line ENC+5V_OUT must be connected to ENC+5V_SENSE and ENC_0V_OUT to ENC_0V_SENSE. The "ENCODER LED lights up when the encoder power supply is switched on."

Lexium SD3
Stepper motor drive

SD328AU25S2

Wiring fieldbus control mode

For the CANmotion or CANopen connection, the RJ45 connection (CN4) is used.



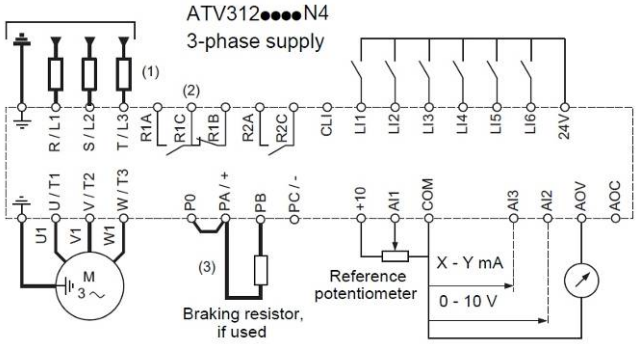
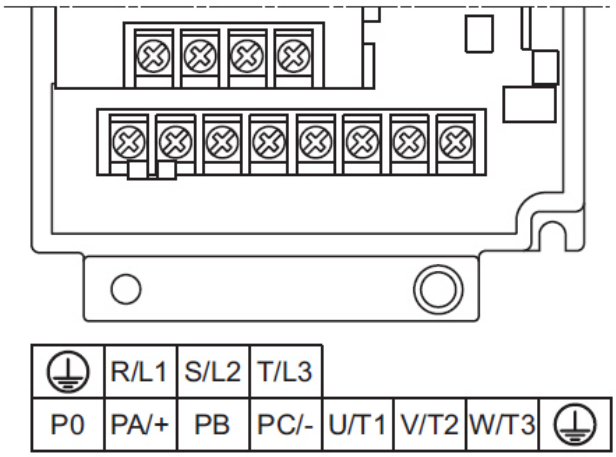
Stepper Motors

BRS3 3-phase for Lexium SD328

BRS397W261ACA

With Incremental encoder (1000 pulses/revolution)

Without holding brake

Variable Speed Drive **Altivar 312** **ATV312H037N4** **and** **ATV312H075N4** 3-phase 400 Vac, 0.37 kW and 0.75 kW	 
Variable Speed Drive **Altivar 312** **ATV312H037N4** **and** **ATV312H075N4** Power terminals	

Variable Speed Drive

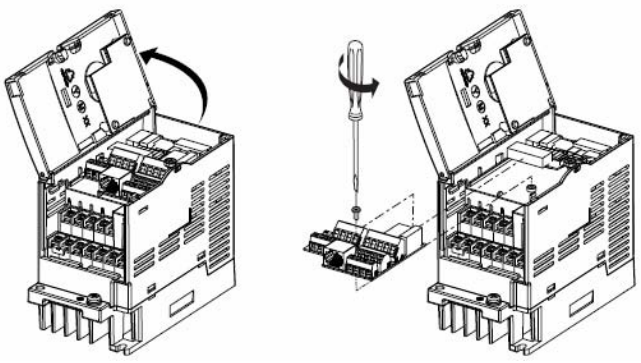
Altivar 312

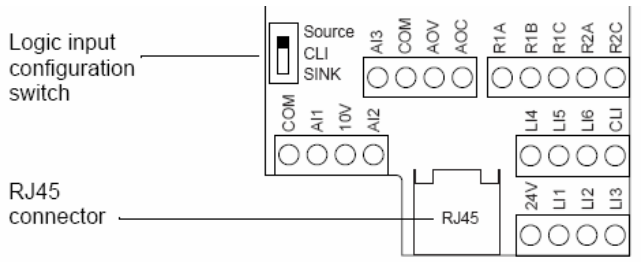
ATV312H037N4

and

ATV312H075N4

Control terminals





Variable Speed Drive

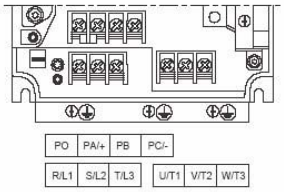
Altivar 71

ATV71H075N4

3-phase

400 Vac, 0.75 kW

Terminal connections including line supply and motor connections



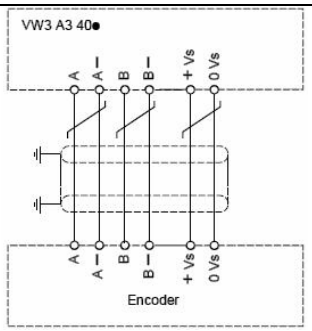
Description of terminals:

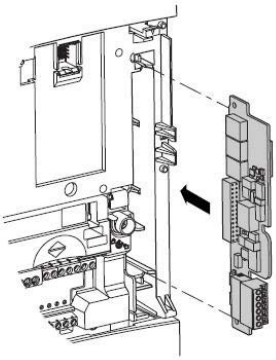
Terminal	Function
⏚	Ground terminal
R/L1 S/L2	Power supply
R/L1 S/L2 T/L3	
PO	DC bus + polarity
PA/+	Output to braking resistor (+ polarity)
PB	Output to braking resistor
PC/-	DC bus - polarity
U/T1 V/T2 W/T3	Outputs to the motor

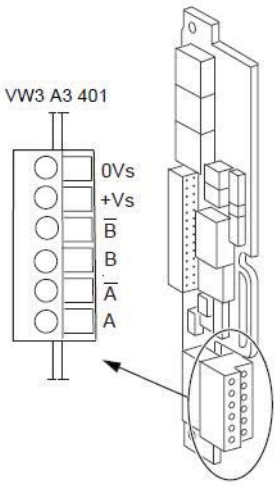
Encoder card for Altivar 71

VW3A3401

5 Vdc, RS422



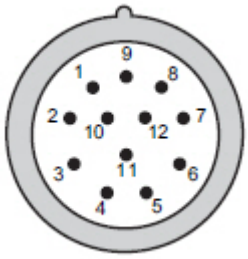




Incremental Encoder for Altivar 71

XCC1510PS11X

5 Vdc, RS422
1024 pulses/revolution



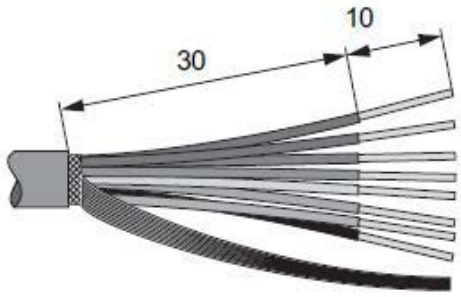
1	2	3	4	5	6	7	8	9	10	11	12
$\overline{A}$	+V	0	$\overline{0}$	B	$\overline{B}$	R	A	R	0 V	0 V	+V

R : Reserved, do not connect to a potential (8)

Encoder cable for Altivar 71

XCCPM23121L5

Prewired M23 female connector with open end (length 5 m)



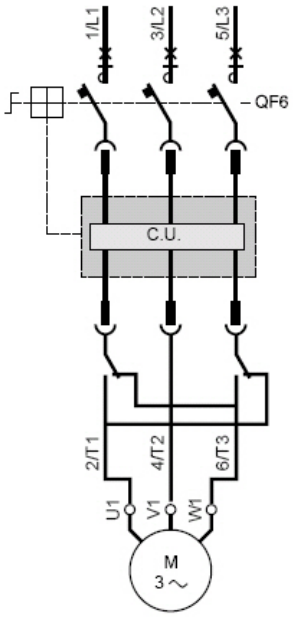
BN	RD	VT	BU	YE	OG	GN	BK
$\overline{A}$	+V	0	$\overline{0}$	B	$\overline{B}$	A	0 V

Motor starter

TeSysU

LUB12BL
Power base for two directions

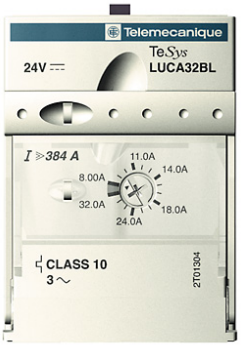
LU9B N11C
Coil wiring kit

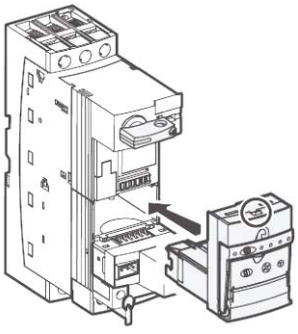


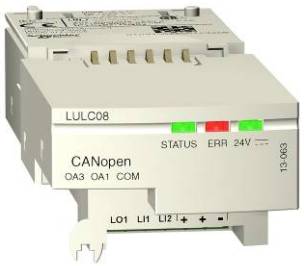
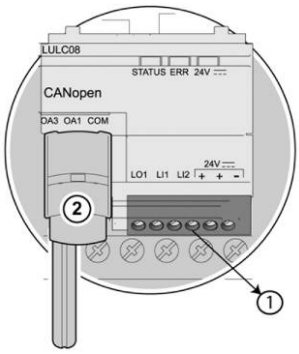
Motor starter

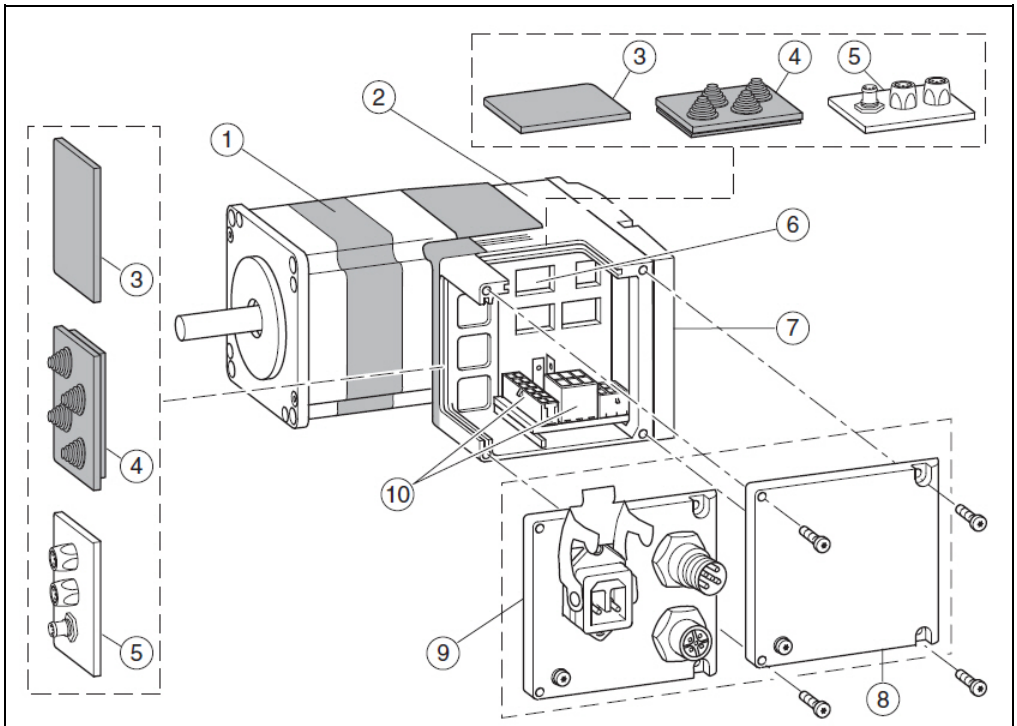
TeSysU

LUCA05BL
control unit



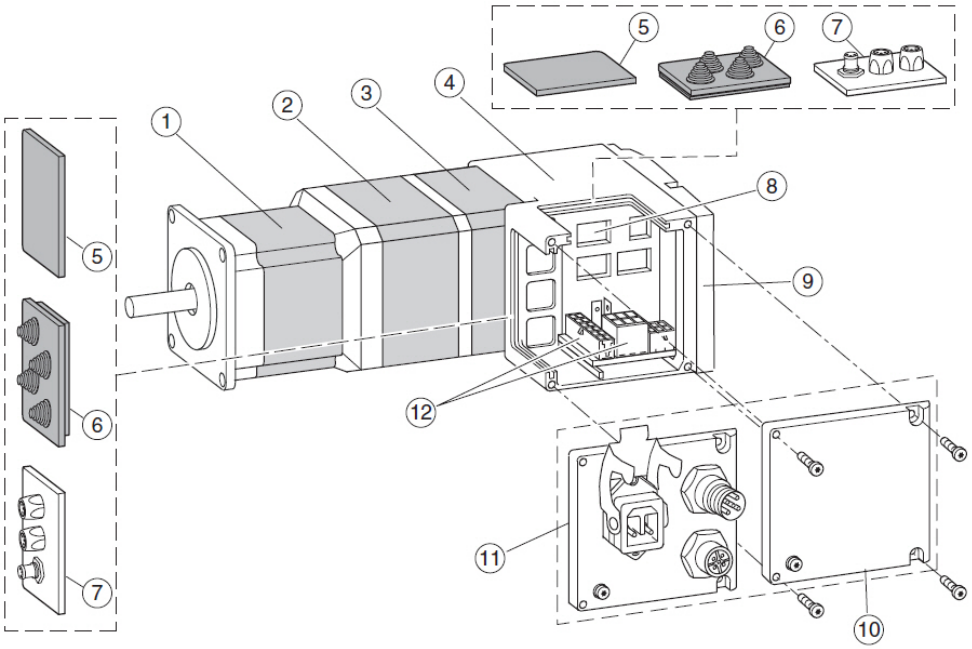


Motor starter **TeSysU** **LULC08** CANopen communication module		 1 24 Vdc power supply 2 Terminal for coil wiring kit
Motor starter **TeSysU** **LU9MRL** Coil wiring kit		
Integrated drive Lexium **ILE with DC brushless motor** **ILE1F661PC1A1**		



1. Brushless DC motor
2. Electronics housing
3. Insert for sealing (accessory)
4. Insert with cable entry (accessory)
5. I/O insert with industrial connector (accessory)
6. Switches for settings
7. Cover of electronics housing, must not be removed
8. Cover of connector housing, to be removed for installation
9. Cover with industrial connector for Vdc supply voltage and IN/OUT fieldbus connection (optional)
10. Electrical interfaces

Integrated drive Lexium **ILA with servo motor** **ILA1F571PC2A**	

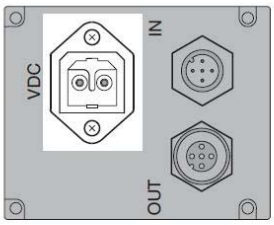


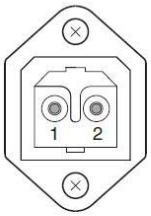
1. Synchronous AC servo motor
2. Holding brake (optional)
3. Encoder
4. Electronics housing
5. Insert for sealing (accessory)
6. Insert with cable entry (accessory)
7. I/O insert with industrial connector (accessory)
8. Switches for settings
9. Cover of electronics housing, must not be removed
10. Cover of connector housing, to be removed for installation
11. Cover with industrial connector for Vdc supply voltage and IN/OUT fieldbus connection (optional)
12. Electrical interfaces

Integrated drive Lexium

Lexium ILA and Lexium ILE

Industrial connector power supply and fieldbus connection





1 VDC
2 0VDC

Pin	Signal	Meaning	Number
1	VDC	Supply voltage	1
2	0VDC	Reference potential to VDC	2

VW3L30001R50
power connection cable, 5 m

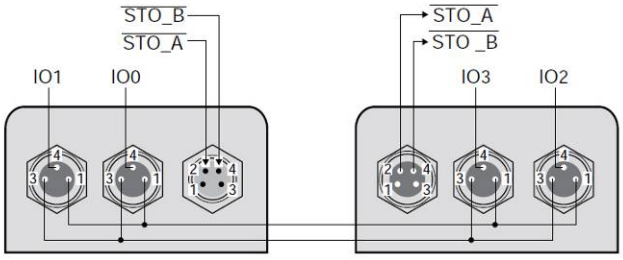
Integrated drive Lexium

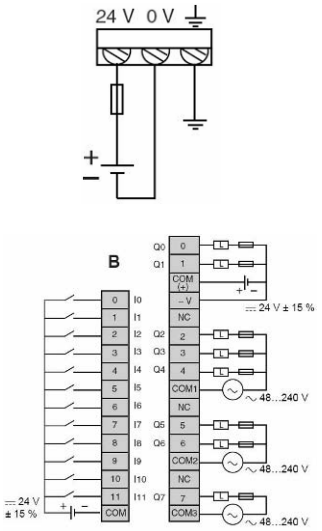
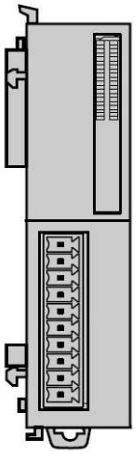
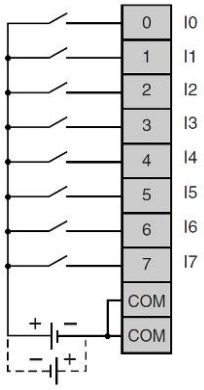
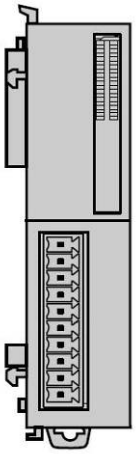
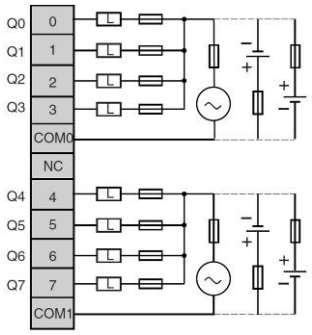
Lexium ILA and Lexium ILE

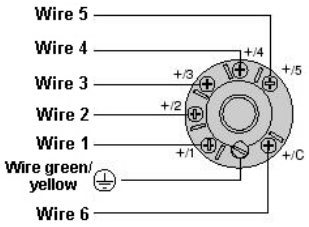
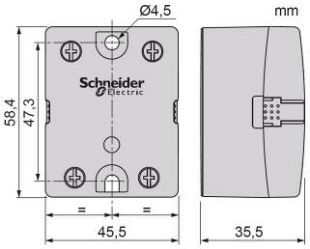
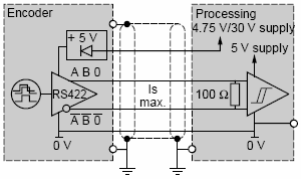
Connection accessories

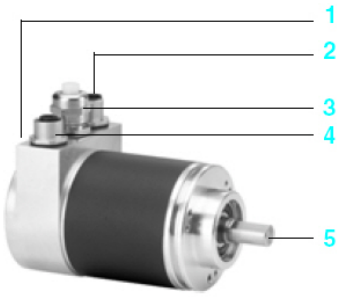
4x I/O,
1x STO in,
1x STO out

VW3L40420
VW3L30010R50
VW3L50200 (2x)



Distributed I/O **Advantys OTB** **OTB1C0DM9LP** Base module 12 Digital Inputs 8 Digital Outputs		
Distributed I/O **Advantys OTB** **TM2DDI8DT** expansion I/O modules 8 Digital Inputs		
Distributed I/O **Advantys OTB** **TM2DRA8RT** expansion I/O modules 8 Digital Outputs		

Harmony **Tower light** **XVBC...**		
Solid state relay **SSRPCDS10A1** Input: 3 … 32 Vdc Output: 24 … 280 Vac 10 A		
Incremental Encoder for ATV71 **XCC1510PS11R** Spring coupling **XCCRAR1010**		type R (N): 5 V output driver, RS 422, 4.5…5.5 V. 

CANopen multi-turn absolute encoder as standalone **XCC3510PS84CB**	 1 2 LEDs 2 M12 male connector (CANopen incoming bus) 3 PG9 connection for supply cable 4 M12 female connector (CANopen outgoing bus) 5 Encoder shaft

Software

General

The main programming work lies in programming the Modicon LMC058 Motion controller, the configuration of the CANopen and CANmotion fieldbus and creating the screens for the HMI display.

Programming the Modicon LMC058 Motion controller is done using SoMachine.

Programming of the Magelis XBTGT 5330 HMI is done by using Vijeo Designer which is integrated into SoMachine.

The configuration of the Advantys OTB Island is done using the Advantys Configuration Software.

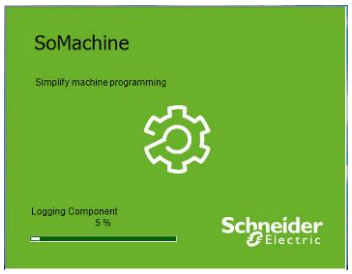
Configuration of the drives (ATV312, ATV71, SD328 and LXM32A) is done using the control panel on the drive.

To use the software packages, your PC must have the appropriate Microsoft Windows operating system installed:

- Windows XP Professional

The software tools have the following default install paths:

- SoMachine
  C:\Program Files\Schneider Electric\SoMachine



- Vijeo Designer (Installed with SoMachine)
  C:\Program Files\Schneider Electric\Vijeo Designer

- Advantys Configuration Software
  C:\Program Files\Schneider Electric\Advantys

Communication

General

The TVDA architecture includes three different communication networks.

The CANopen fieldbus includes the Modicon LMC058 Motion controller as CANopen Master. The Altivar drives, Advantys OTB-Island, Integrated drive Lexium (ILA and ILE), TeSysU and OsiSense (Osicoder) are CANopen slave nodes. The CANopen transmission rate is 500 kBit/s.

The CANmotion fieldbus includes the Modicon LMC058 Motion controller as Master. The Lexium 32 servo drives and Lexium SD3 stepper drives are slave nodes. The CANmotion transmission rate is 1 MBit/s.

The Modicon LMC058 Motion controller and the Magelis HMI communicate using the SoMachine protocol based on Ethernet. Both devices are connected via an Ethernet switch. Also a PC can connect to this Ethernet switch for downloading to the HMI.

The PC has to be connected to the controller over USB.

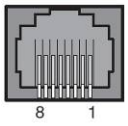
The front panel is used to configure ATV312, ATV71, SD3 and LXM32A.

Altivar 312

Modbus / CANopen port

Node ID: 1..4 and 11+12

Note :
In case of CANopen, the CANopen Tap **TSXCANTDM4** is used to connect the VSD drive to the CANopen bus via RJ45 socket.



Pin	Signal	Description
1	CAN_H	data wire
2	CAN_L	data wire, inverted
7	MOD+10V_OUT	10V power supply
8	MOD_0V	Reference potential for MOD+10V_OUT

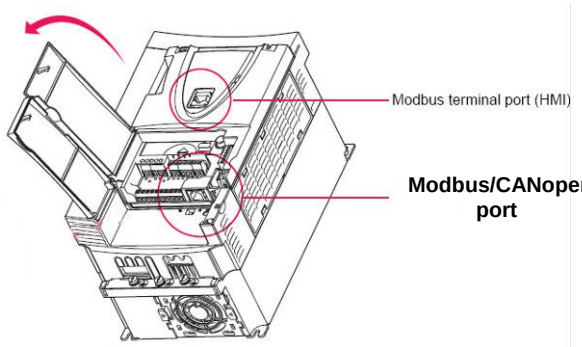
Pin	Signal	Description	
4	MOD_D1	Bidirectional transmit/receive signal	RS485 level
5	MOD_D0	Bidirectional transmit/receive signal, inverted	RS485 level
7	MOD+10V_OUT	10 V power supply, max. 150 mA	Output
8	MOD_0V	Reference potential for MOD+10V_OUT	Output

Altivar 71

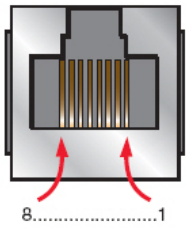
Modbus / CANopen port

Node ID: 5..6

Note :
In case of CANopen, the CANopen Tap **TSXCANTDM4** is used to connect the VSD drive to the CANopen bus via RJ45 socket.



View from underneath



Pin	Signal
1	CAN_H
2	CAN_L
3	CAN_GND
4	D1 (1)
5	D0 (1)
6	Not connected
7	VP (2)
8	Common (1)

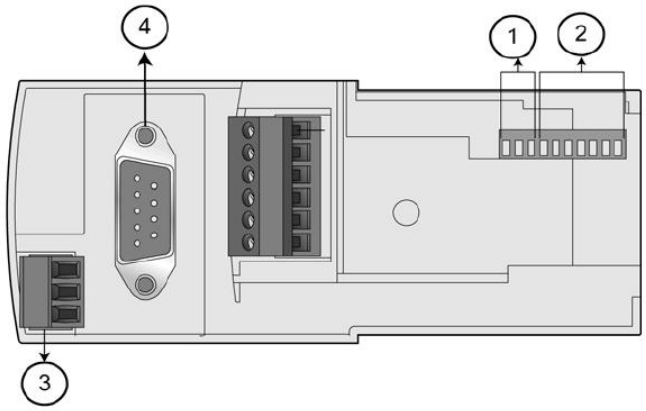
(1) Modbus signal
(2) Power supply for an RS232/RS485 converter (to PowerSuite)

TeSysU CANopen communication module

LULC08

The communication module is connected to the CANopen bus using cable

TSXCANCADD1



1 Baud rate
2 Address
3 Power base connector
4 CAN bus connector

TeSysU CANopen communication module

LULC08

The baud rate is set to 500 kbps.

SW10	SW9	SW8	Baud Rate
0	0	0	10 kbps
0	0	1	20 kbps
0	1	0	50 kbps
0	1	1	125 kbps
1	0	0	250 kbps (default)
1	0	1	500 kbps
1	1	0	800 kbps
1	1	1	1,000 kbps

The following address is used:
Node ID: 13

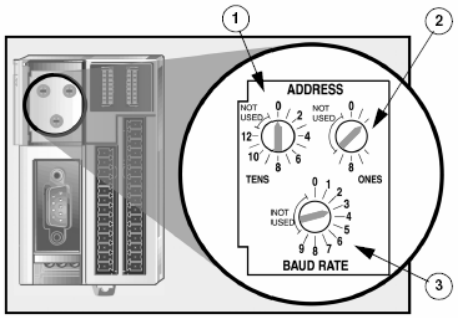
SW7	SW6	SW5	SW4	SW3	SW2	SW1	Address
0	0	0	0	0	0	0	Not valid
0	0	0	0	0	0	1	1 (default)
0	0	0	0	0	1	0	2
0	0	0	0	0	1	1	3
0	0	0	0	1	0	0	4
0	0	0	0	1	0	1	5
0	**0**	**0**	**1**	**1**	**0**	**1**	**13**

Advantys OTB CANopen

OTB1CODM9LP

Node ID: 14

Baudrate **500 kBits/s**

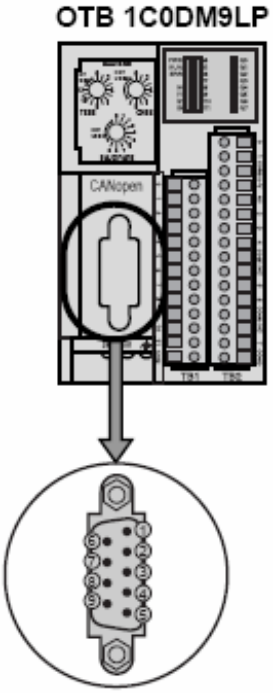


1. Network address (Node-ID x10) encoder wheel
2. Network address (Node-ID x1) encoder wheel
3. Transmission speed encoder wheel

Position (lower encoder rate)	Baud Rate
0	10 kbits/s
1	20 kbits/s
2	50 kbits/s
3	125 kbits/s
4	250 kbits/s
5	500 kbits/s
6	800 kbits/s
7	1 Mbits/s
8	Automatic
9	Default rate (250 kbits/s)

Advantys OTB CANopen Port

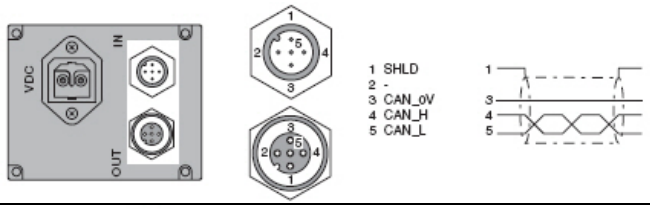
OTB1C0DM9LP



CANopen	
①	–
②	CAN_L
③	CAN_GND
④	–
⑤	CAN_SHLD
⑥	GND
⑦	CAN_H
⑧	–
⑨	CAN_V+

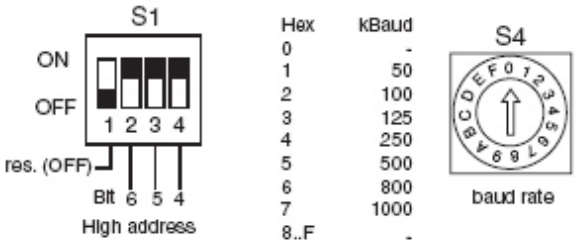
Integrated drive Lexium

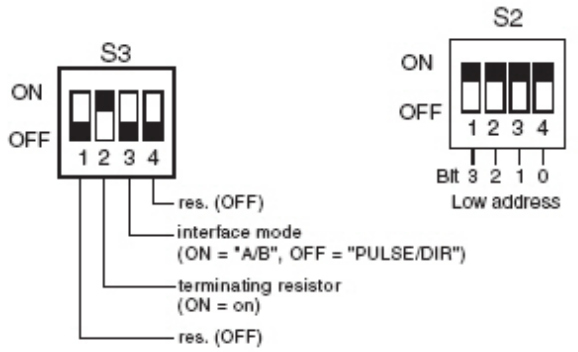
CANopen port



Node ID: 21..22

Baudrate 500 kBits/s





Switch settings S1 and S2:	S1.2	S1.3	S1.4	S2.1	S2.2	S2.3	S2.4
Address bit:	6	5	4	3	2	1	0
Fieldbus address 127 (default)	1	1	1	1	1	1	1
Fieldbus address 25 (example)	0	0	1	1	0	0	1

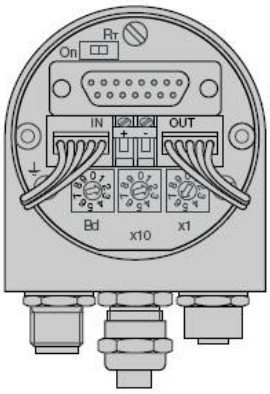
Switch setting S4	Baud rate (Kbaud)
1	50
2	100
3	125
4	250
5	500
6	800
7	1000

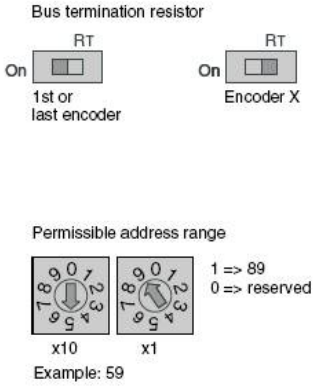
OsiSense (Osicoder) CANopen multi-turn absolute encoder

XCC3510PS84CB

Node ID: 23

Baudrate (**Bd**) is set to **5** which is 500 kBits/s





Bus IN
M12 male connector

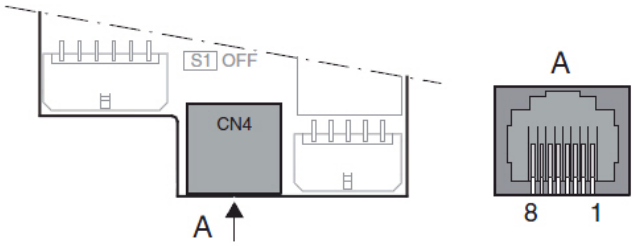
Bus OUT
M12 female connector

Pin	1	2	3	4	5
Function	CAN_SHLD	(CAN_V+)	CAN_GND	CAN_H	CAN_L
Terminal	+	–			
Function	24 V	0 V			

Lexium SD3

CANmotion port

Node ID: 1..2



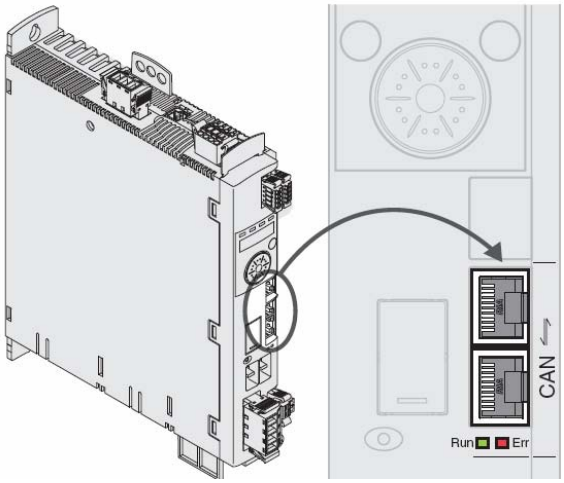
Pin	Signal	Description	I/O
1	CAN_H	Data cable	CAN level
2	CAN_L	data wire, inverted	CAN level
7	MOD+10V_OUT	10V power supply (assignment different from CANopen)	O
8	MOD_0V	Reference potential CAN/Modbus	O

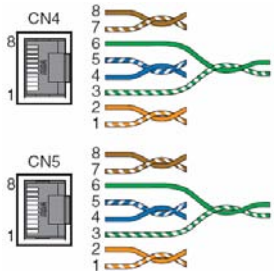
Pin	Signal	Description	I/O
4	MOD_D1	Bidirectional send/receive signal	RS485 level
5	MOD_D0	Bidirectional send/receive signal, inverted	RS485 level
7	MOD+10V_OUT	10V power supply, max. 150mA	O
8	MOD_0V	Reference potential to MOD+10V_OUT	O

Lexium 32A

CANmotion port

Node ID: 3..6





Pin Signal Meaning I/O

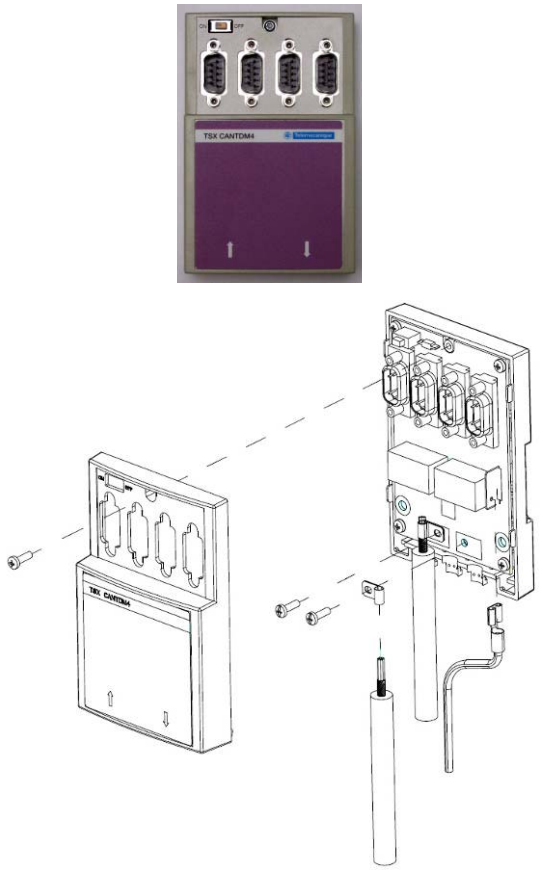
1. CAN_H CAN interface CAN level
2. CAN_L CAN interface CAN level
3. CAN_0V Reference potential CAN -
4. nc not used -
5. nc not used -
6. nc not used -
7. nc not used -
8. nc not used -

CANopen TAP

TSXCANTDM4

4 port CANopen junction box

For the purpose of this application, the sliding switch should be set to **OFF** if it is not at the end of the CANopen line.



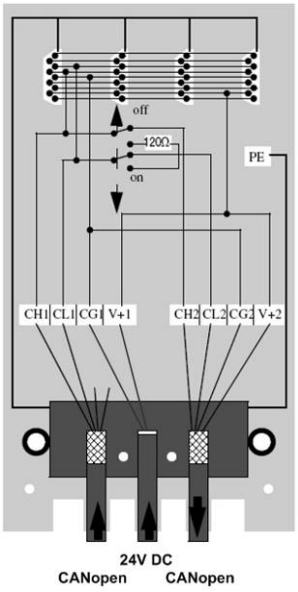
CANopen TAP

TSXCANTDM4

Note: When using devices which require a 24 Vdc power supply on CANopen line (such as TeSysU) the 24 Vdc power must be wired.

Power supply:

V+1 24 Vdc
CG1 0 Vdc



Signal	Terminal block 1	Terminal block 2	Wire color
CAN_H	CH1	CH2	white
CAN_L	CL1	CL2	blue
CAN_GND	CG1	CG2	black
CAN_V+	V+1	V+2	red

<table>
<tr>
<td>CANopen connector

VW3CANKCDF90T,
VW3CANKCDF90TP
or
VW3CANKCDF180T

These connectors are used for the link to the CANopen node.</td>
<td>
VW3CANKCDF90T,
VW3CANKCDF90TP</td>
<td>
VW3CANKCDF180T</td>
</tr>
<tr>
<td rowspan="2">CANopen preassembled connection cable</td>
<td>
TCSCCN4F3M1T
(length: 1.0 m)

Used to connect the ATV312, ATV71 and TSXCANTDM4.</td>
<td>
TSXCANCADD1
(length: 1.0 m)

Used to connect the controller, OTB, TeSysU and TSXCANTDM4.</td>
</tr>
<tr>
<td>
VW3CANCARR03
(length: 0.3 m)
VW3CANCARR1
(length: 1.0 m)

Used to connect the LXM32A.</td>
<td>
TCSCTN023F13M03
(length: 0.3 m)

Used to connect the SD328.</td>
</tr>
</table>

CANopen cable

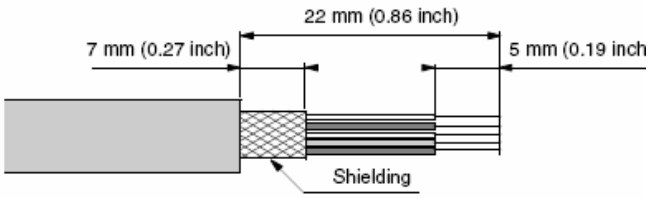
TSXCANCx y

The cable is available in various versions (**x**):

A - Standard
B - No Flame
D - Heavy Duty

and various lengths (**y**):

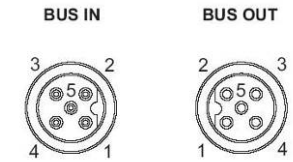
50 - for 50 m
100 - for 100 m,
300 - for 300 m.



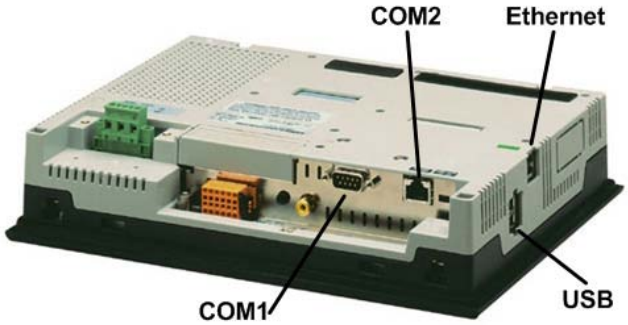
CANopen preassembled connection cable

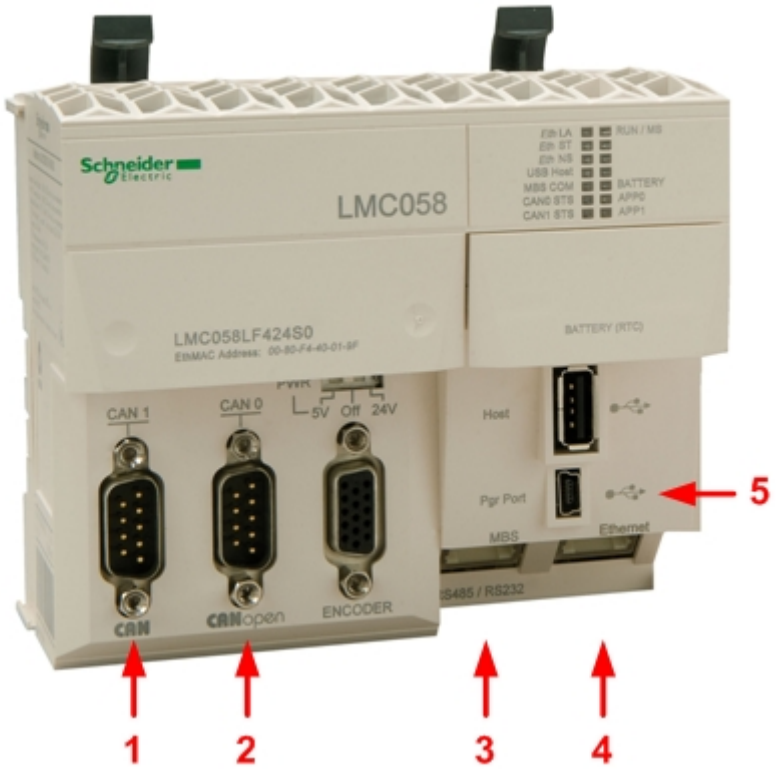
FTXCN32xx

Used for the connection between the racks and the field devices.

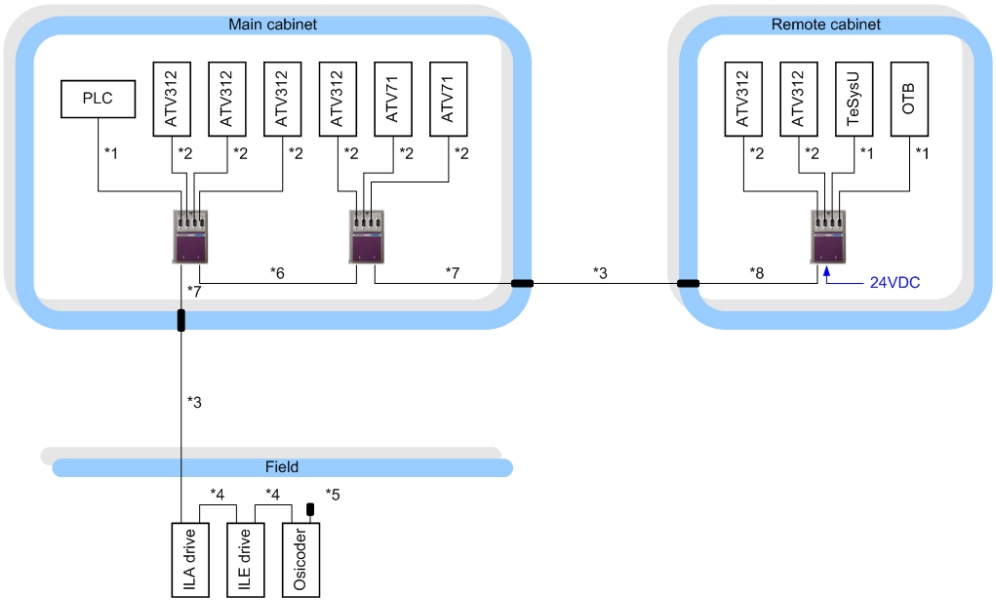


PIN	Signal	Colour
1	Shield	-
2	V+	Red
3	GND	black
4	CAN_H	White
5	CAN_L	Blue

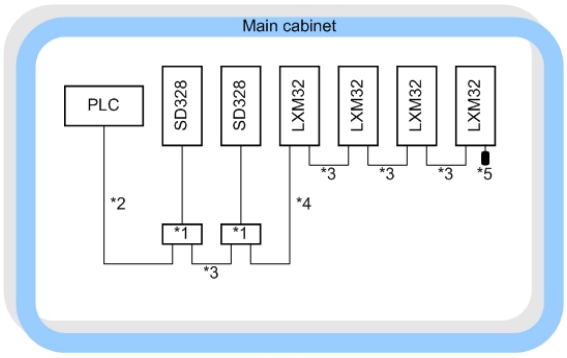
ConneXium Ethernet 5 port switch **TCSESU053FN0** for the connection of Controller, HMI and PC	
Magelis HMI **XBTGT5330** The Ethernet connection is used to communicate with the controller and the PC.	
ConneXium Ethernet cable **490NTW0000x** Ethernet cable is used for the switch<->Controller, switch<->HMI and switch<->PC connection.	

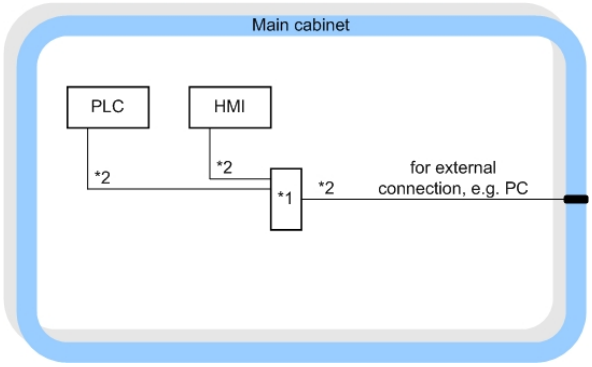
Controller **LMC058** **LMC058LF424S0**	1. CANmotion port 2. CANopen port 3. RS485 port 4. Ethernet port 5. Mini B USB port
	

CANopen cabling component	*1 – TSX CAN CADD1 *2 – TCS CCN4F3M1T *3 – FTX CN3250 *4 – FTX CN3210 *5 – FTX CNTL12 *6 – TSX CAN CD50 *7 – 1525704 (Phoenix Contact) *8 – 1525652 (Phoenix Contact)



CANmotion cabling component	*1 – TCS CTN023F13M03 *2 – VW3 M3 805R010 *3 – VW3 CAN CARR 03 *4 – VW3 CAN CARR 1 *5 – TCS CAR01NM120



Ethernet cabling component	*1 – TCSESU053FN0 (Ethernet switch) *2 – 490NTW0000x (Ethernet cable)
	

Implementation

Introduction

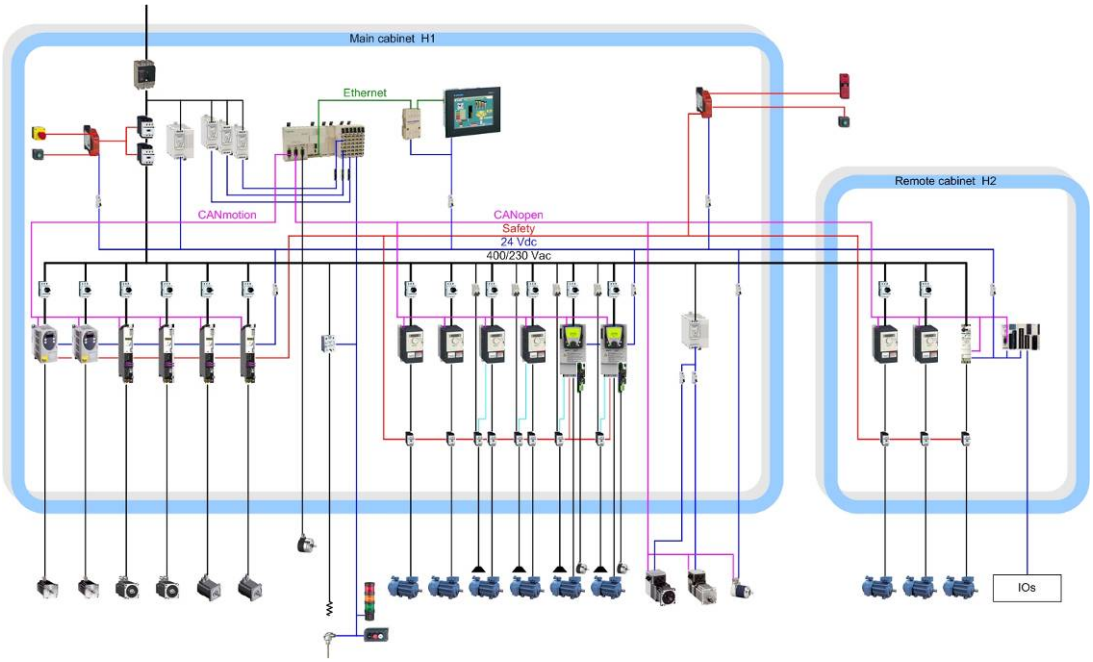
The implementation chapter describes all the steps necessary to initialize, to configure, to program and start-up the system to achieve the application functions as listed below.

Function

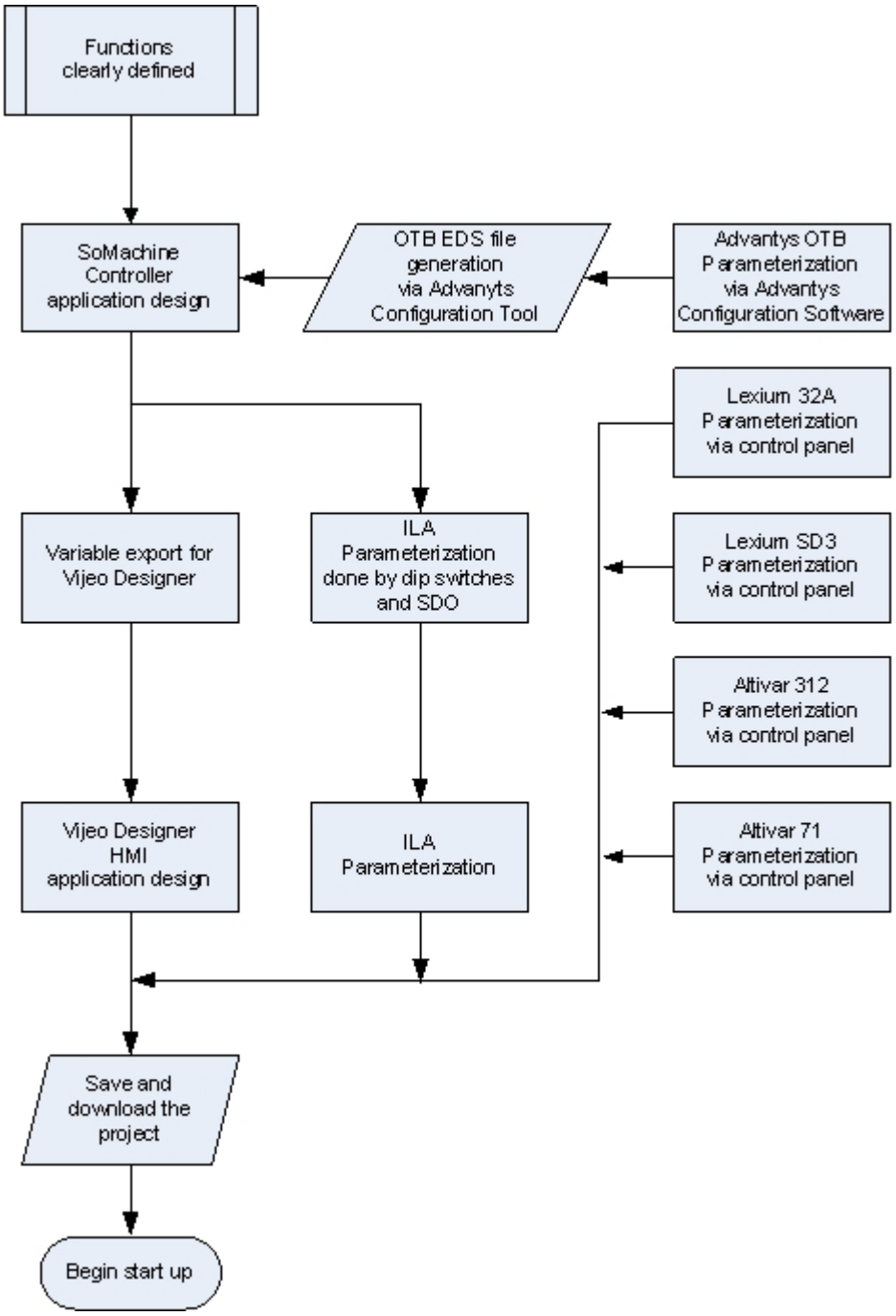
Start up and functional description

1. Check if all motor circuit breakers and Multi9 circuit breakers are in ON position.
2. Turn on the power using the main switch
3. Acknowledge the Emergency Stop by pressing the acknowledge pushbutton
4. Check safety guard(s) and acknowledge by pressing the acknowledge pushbutton
5. Wait for the blue light to turn off
6. Use Magelis XBTGT HMI to control the system.
    a. Use the “Bus”, “Alarm” and “Safety” screens to control error messaging and supervise the Emergency Stop.
    b. Use the “SD3”, “LXM32”, “ATV..”, “ILx” and “TeSysU” screen to control the different drives and motor starters.
    c. The “Mix” screen can be used to observe the I/O status of the OTB and the encoder values.

Functional Layout



Course of Action


Functions clearly defined
SoMachine Controller application design
OTB EDS file generation via Advanyts Configuration Tool
Advantys OTB Parameterization via Advantys Configuration Software
Lexium 32A Parameterization via control panel
Variable export for Vijeo Designer
ILA Parameterization done by dip switches and SDO
Lexium SD3 Parameterization via control panel
Altivar 312 Parameterization via control panel
Vijeo Designer HMI application design
ILA Parameterization
Altivar 71 Parameterization via control panel
Save and download the project
Begin start up

Communication

Introduction

This chapter describes the data passed via the fieldbus and networks (e.g. CANopen or Ethernet) that are not bound directly with digital or analog hardware.

The list contains:

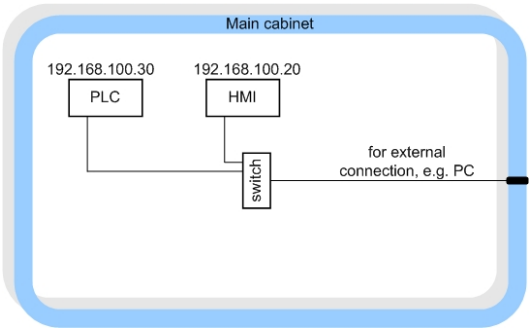
- The device links
- Direction of data flow
- Symbolic name and
- Bus address of the device concerned.

Device Links

This application uses CANmotion and CANopen fieldbusses for field device communication.

Additional the SoMachine protocol over Ethernet is used for HMI communication and connects:

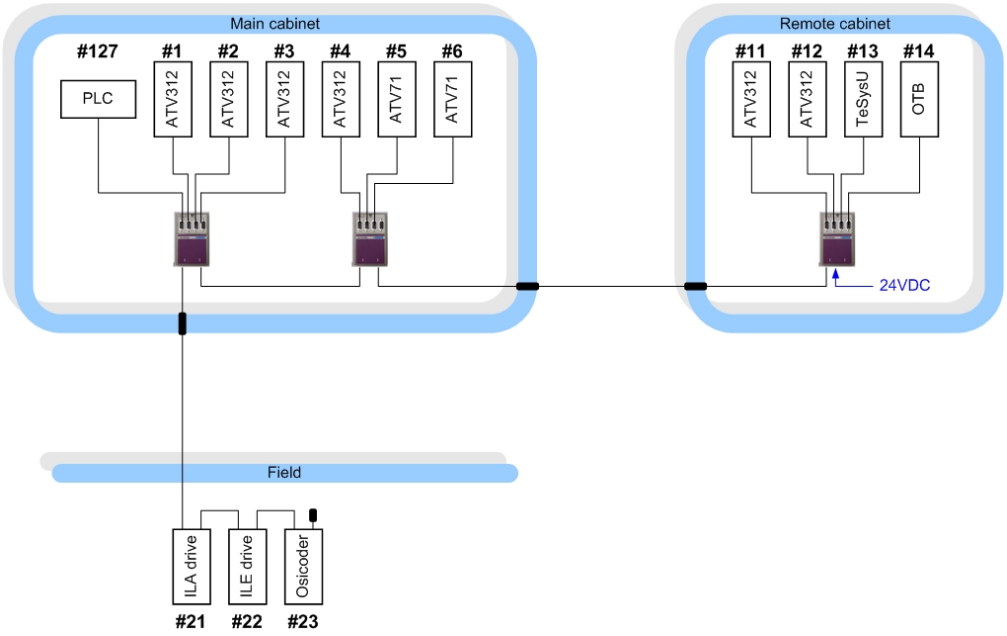
Magelis XBTGT HMI (IP 192.168.100.20)
Modicon LMC058 (IP 192.168.100.30)
Subnet Mask: 255.255.255.0



CANopen connects the following devices:

1 Modicon LMC058 Motion controller on bus address 127
6 Altivar 312 variable speed drives, bus addresses 1..4 and 11..12
2 Altivar 71 variable speed drives, bus addresses 5..6
1 TeSysU motor starter, bus address 13
1 Advantys OTB I/O island, bus addresses 14
2 ILx Integrated drive Lexium, bus addresses 21..22
1 OsiSense (Osicoder) CANopen encoder, bus address 23

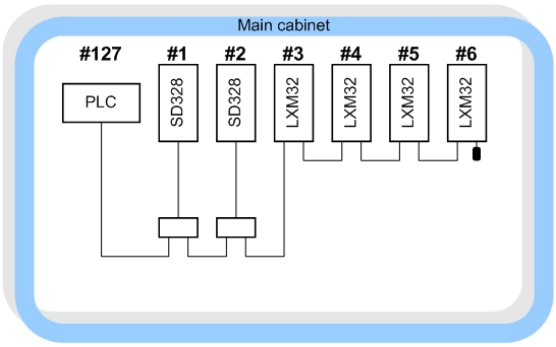
The baudrate used is 500 kBits/s



CANmotion connects the following devices:

1 Modicon LMC058 Motion controller on bus address 127
2 Lexium SD328 stepper motor drives, bus addresses 1..2
4 Lexium 32A servo drives, bus addresses 3..6

The baudrate used is 1 MBits/s



NOTE

For the data exchange between the Controller and the Lexium 32A, Lexium SD328 stepper motor drive, Altivar 312, Altivar 71 and Integrated drive Lexium IIx the PLCopen function blocks are used. It is not necessary to configure the data exchange manually.

Datalink **OTB <> LMC058**	**LMC058** *(CANopen-Master, #127**)***	**OTB** *(CANopen-Slave #14)*
	Data Direction OTB -> LMC058	
	Name	**Designation**
	i_usiOTBin1 i_usiOTBin2 i_usiOTBin3	First input byte (OTB 1CODM9LP) Second input byte (OTB 1CODM9LP) Third input byte (OTB TM2DDI8DT)
	Data Direction Controller -> LMC058	
	Name	**Designation**
	q_usiOTBout1 q_usiOTBout2	First output byte (OTB 1CODM9LP) Second output byte (reserved) Third output byte (OTB TM2DDRA8RT)

Datalink **TeSysU <> LMC058**	**Controller** *(CANopen-Master, #127**)***	**TeSysU** *(CANopen-Slave #13)*
	Data Direction TeSysU -> LMC058	
	Name	**Designation**
	i_uiTeSysStat	Status data of TeSysU
	Data Direction LMC058 -> TeSysU	
	Name	**Designation**
	q_uiTeSysCtrl	Control data of TeSysU
	q_uiTeSysCtrlCom	Control of comm module

Datalink **Osicoder <> LMC058**	**LMC058** *(CANopen-Master, #127**)***	**OsiSense (Osicoder)** *(CANopen-Slave #23)*
	Data Direction OsiSense (Osicoder) -> LMC058	
	Name	**Designation**
	i_udiEncoder Value	Actual position value

Controller

Introduction

The Controller chapter describes the steps required for the initialization and configuration and the source program required to fulfill the functions.

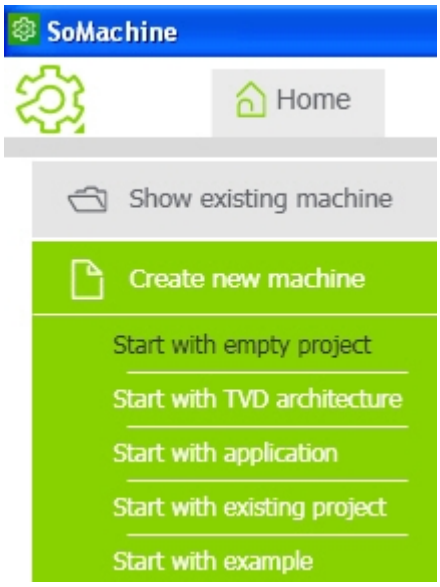
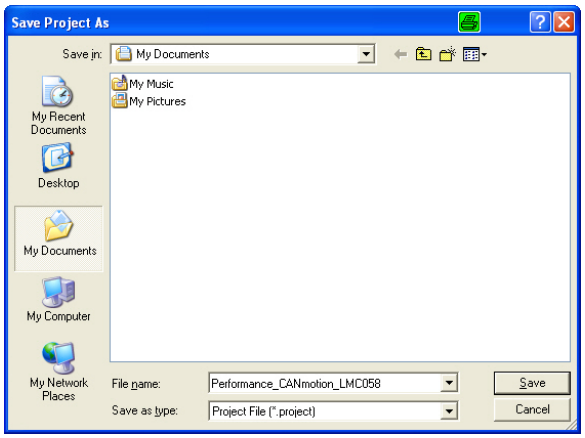
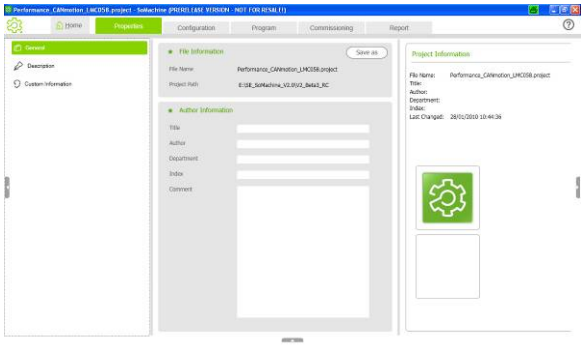
Requirements

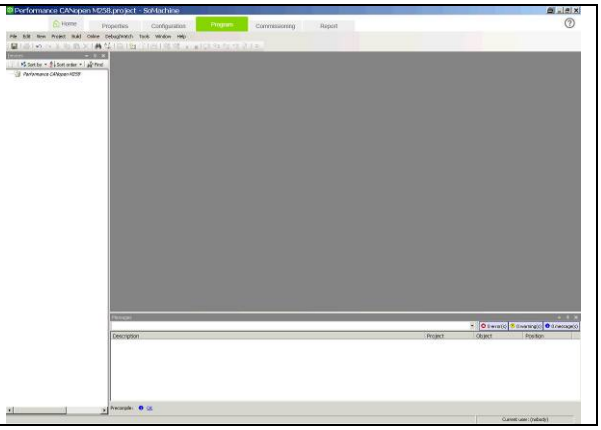
- SoMachine V2 is installed on your PC
- The Modicon LMC058 Motion controller is switched on and running
- The controller is connected to the HMI with the Ethernet cable **490NTW0000x** (controller to HMI)
- The controller is connected to the PC via the USB cable **TCSXCNAMUM3P**

Setting up the controller is done as follows:

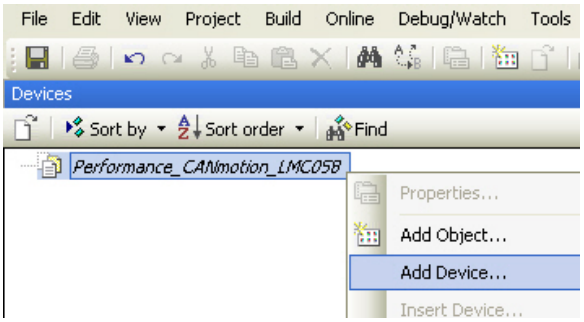
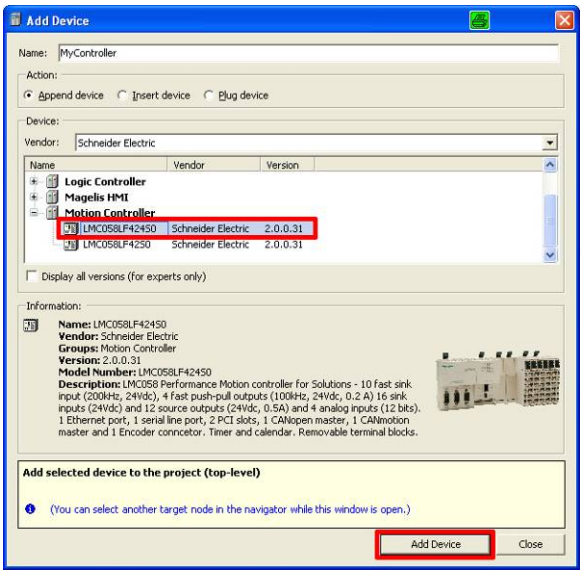
- Create a new project
- Add the controller
- Add Expansion Modules
- Add the CANopen fieldbus
- Add CANopen devices
- Import the OTB EDS file
- ATV312 CANopen configuration
- ATV71 CANopen configuration
- OTB CANopen configuration
- TeSysU CANopen configuration
- OsiSense (Osicoder) CANopen configuration
- Integrated drive Lexium ILx CANopen configuration
- Add the CANmotion bus
- Add CANmotion Devices
- CANmotion device configuration
- Add Toolbox Library
- Add POU
- Task configuration
- Add Vijeo Designer HMI
- Ethernet settings
- Configure Controller ↔ HMI Data Exchange
- Communication Setting Controller ↔ PC
- Communication Setting HMI ↔ PC
- Save the Project
- Build Application
- Download the Controller and HMI project
- Login to the Controller
- Application overview

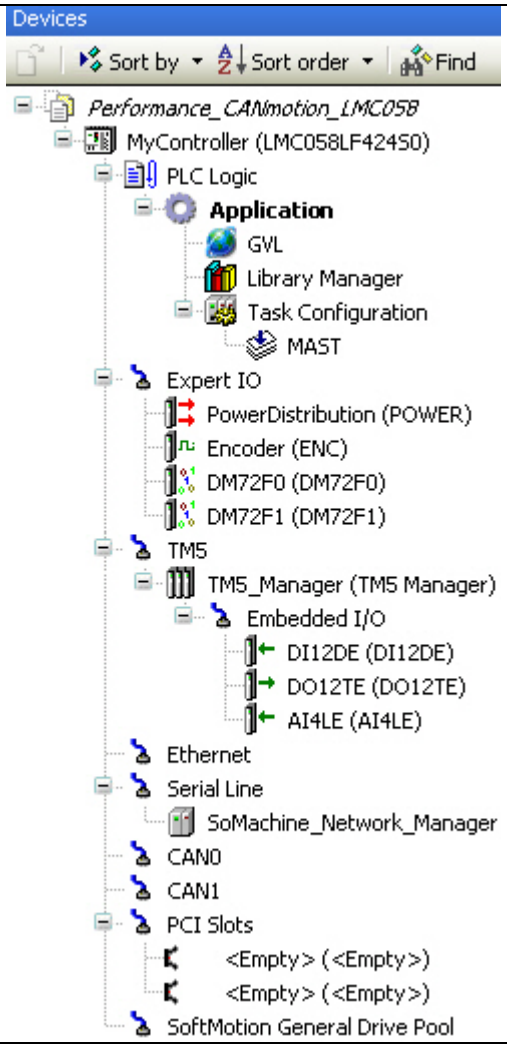
Create a new project

1	To create a new project select **Create new machine** → **Start with empty project**	
2	In the **Save Project As** dialog enter a **File name** and press **Save.** Note: As default the project is saved under My Documents.	
3	The SoMachine User Interface opens.	
4	In the User Interface select the **Program tab**	

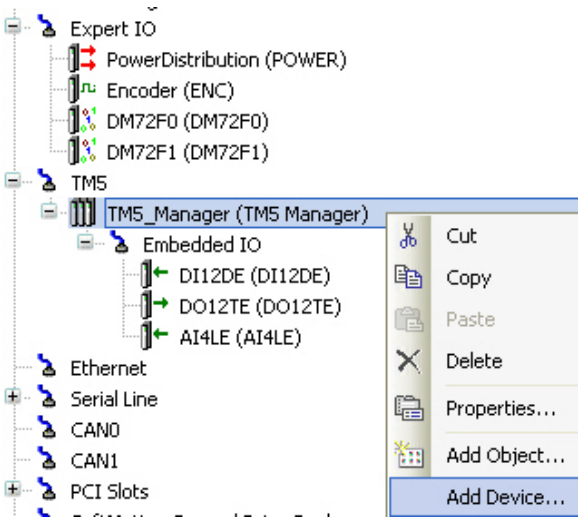
5	The Program window appears	

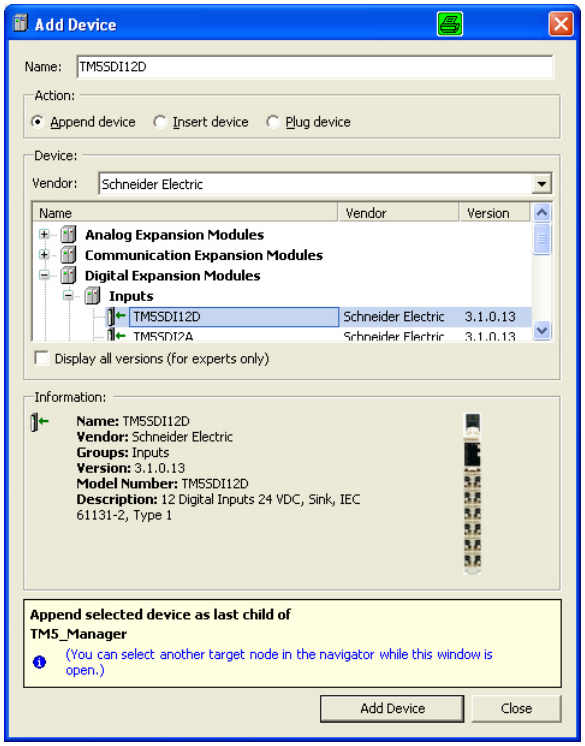
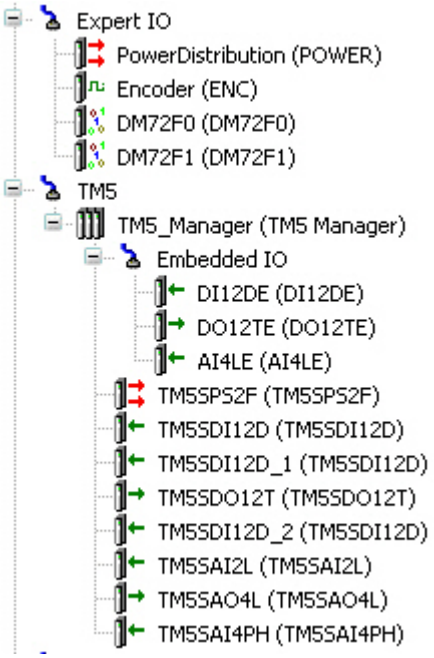
Add a controller

1	Right click on **Performance_CANmotion_ LMC058.** Select **Add Device…** in the pop up menu.	
2	Select **Schneider Electric** as **Vendor**. Then select: **Motion Controller LMC058LF424S0** as the controller device. Click on **Add Device.**	

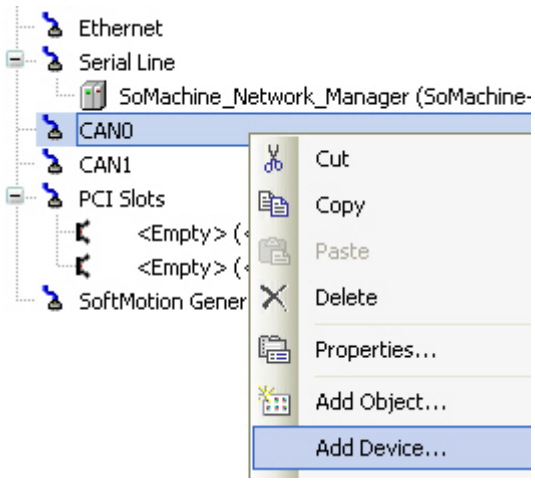
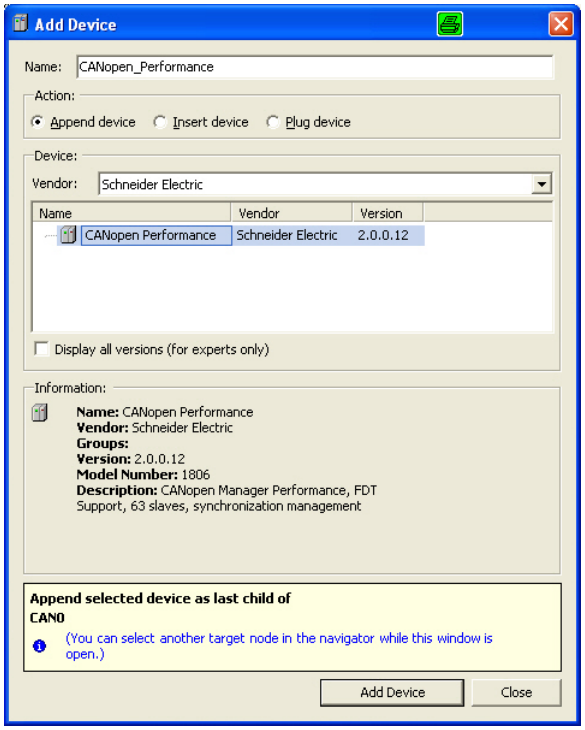
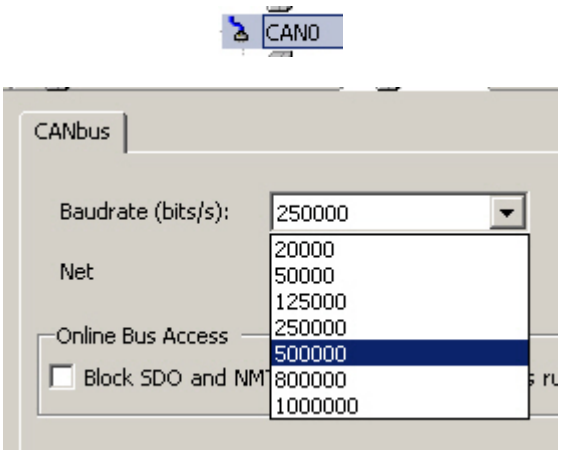
3	The **Devices** folder now displays the new controller.	

Add Expansion Modules

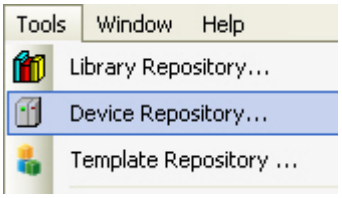
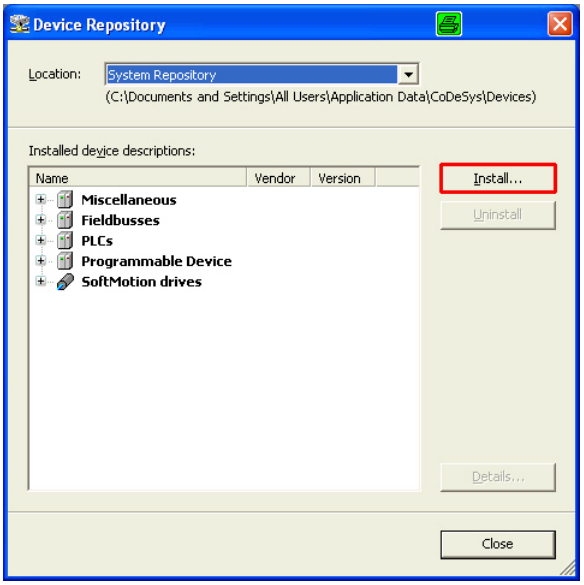
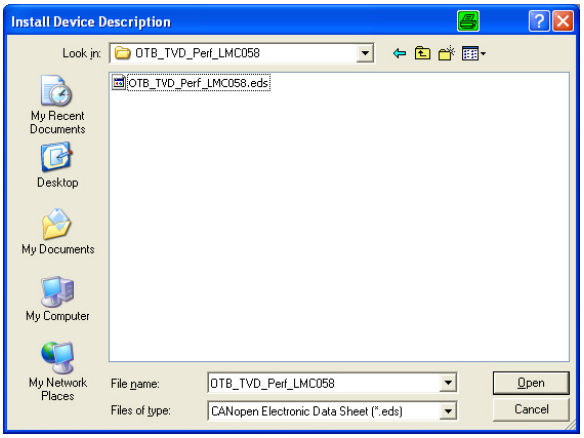
1	To add an expansion module, right click on **TM5_Manager** and click on **Add Device…**	

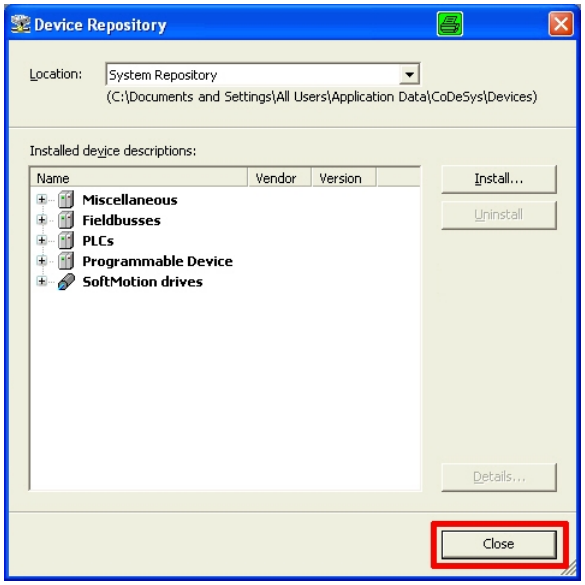
2	Select the expansion module and click on **Add Device.** For this project add the following cards: **1x TM5SPS2F** **2x TM5SDI12D** **1x TM5SDO12T** **1x TM5SDI12D** **1x TM5SAI2L** **1x TM5SAO4L** **1x TM5SAI4PH** Once you have added all the cards **Close** the dialog.	
3	The added expansion module can now be seen at the end of the device list.	

Add the CANopen fieldbus

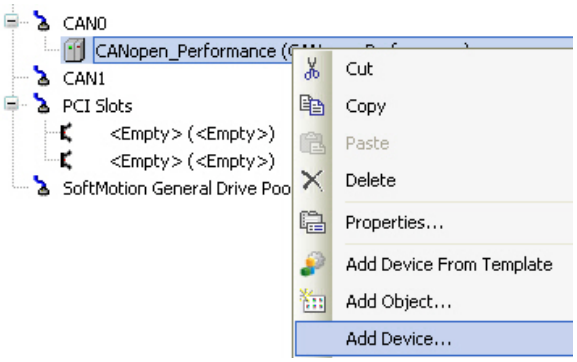
1	Right click on **CAN0** and select: **Add Device...**	
2	Select: **CANopen Performance** Click on **Add Device.**	
3	Double click on **CAN0** and select for **Baudrate (bit/s) 500000** in the pull down menu.	

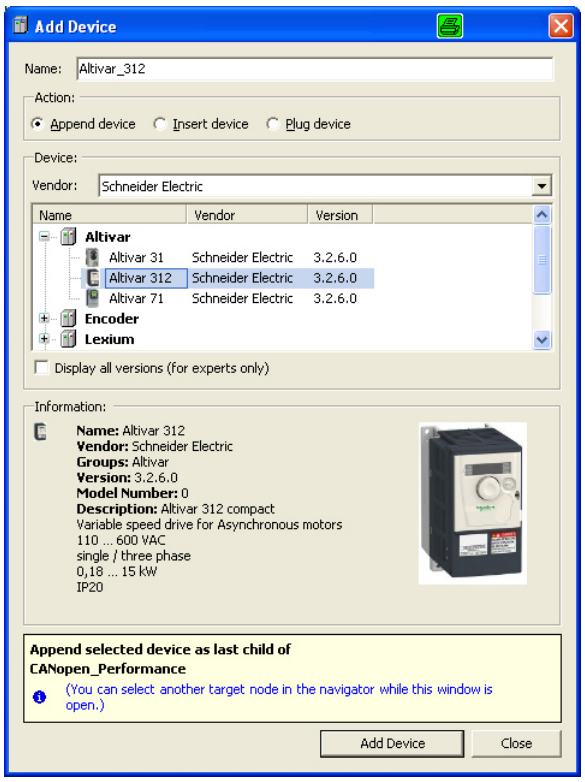
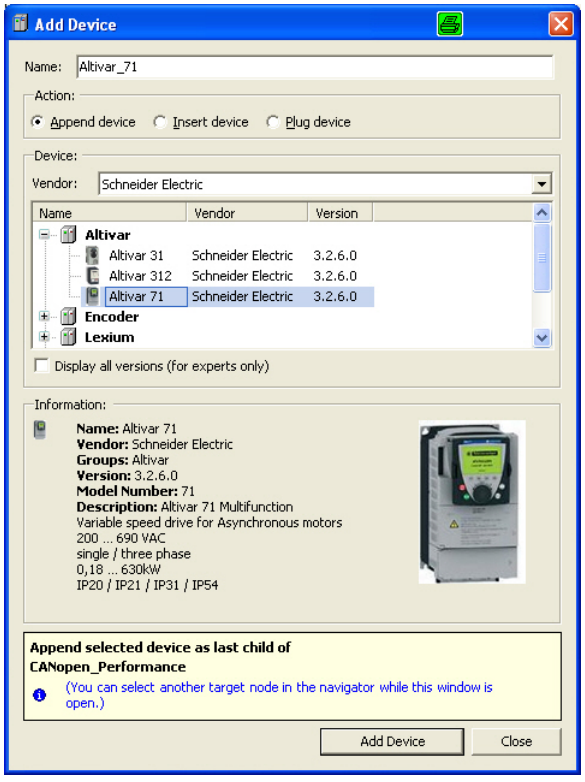
Import the OTB EDS file

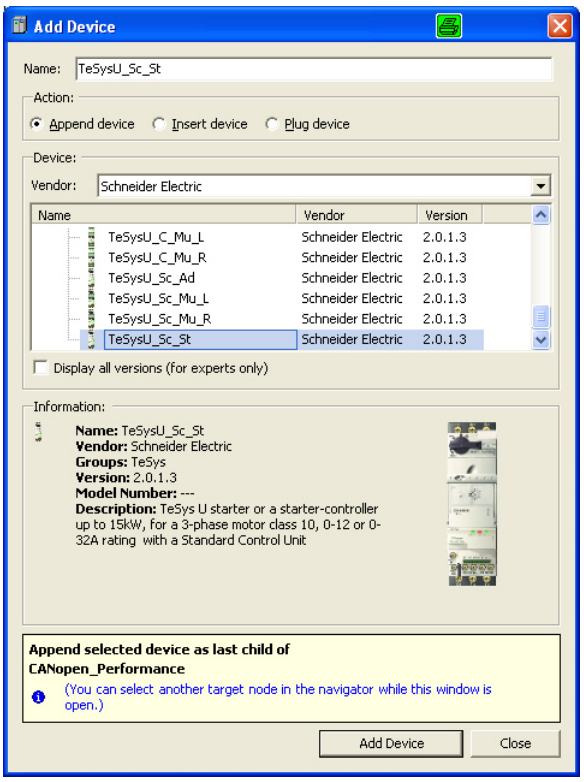
1	To use the extended OTB island (configured by Advantys Configuration Software) you have to import the OTB eds file. Select **Tools ->** **Device Repository**.	
2	In the **Device Repository** select **Install …**	
3	Select the **OTB EDS file.** In this project the OTB EDS file is named OTB_TVD_Perf_LMC058.eds Press **Open**	

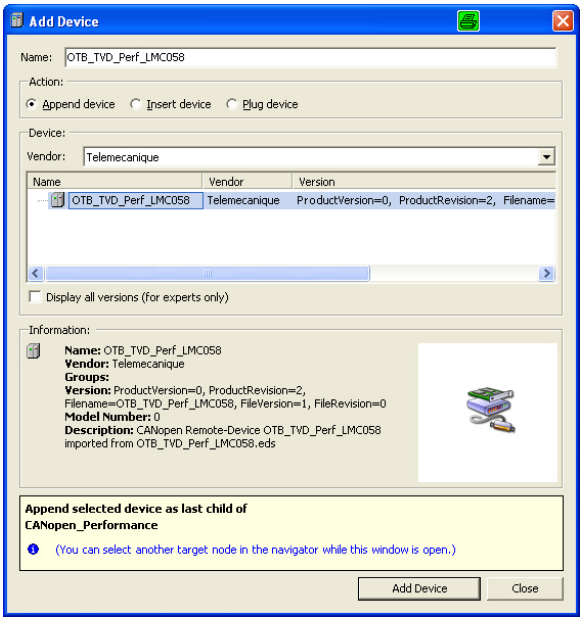
4	Press **Close**	

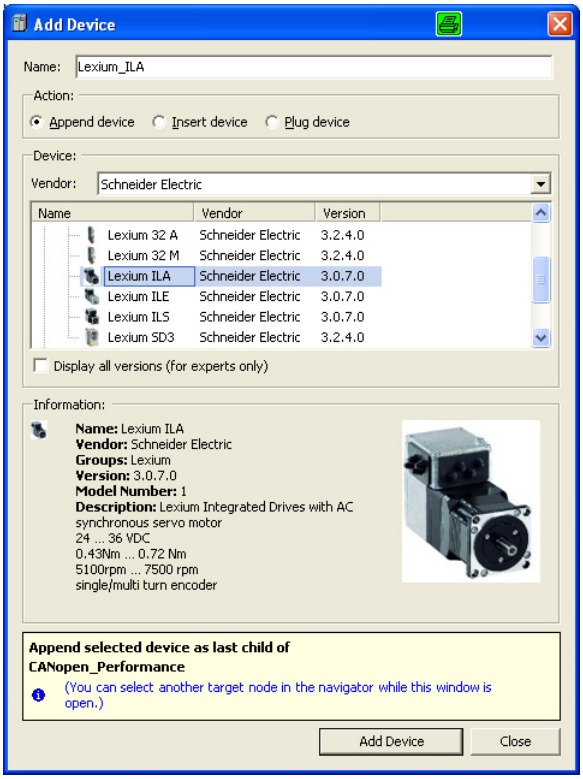
Add CANopen Devices

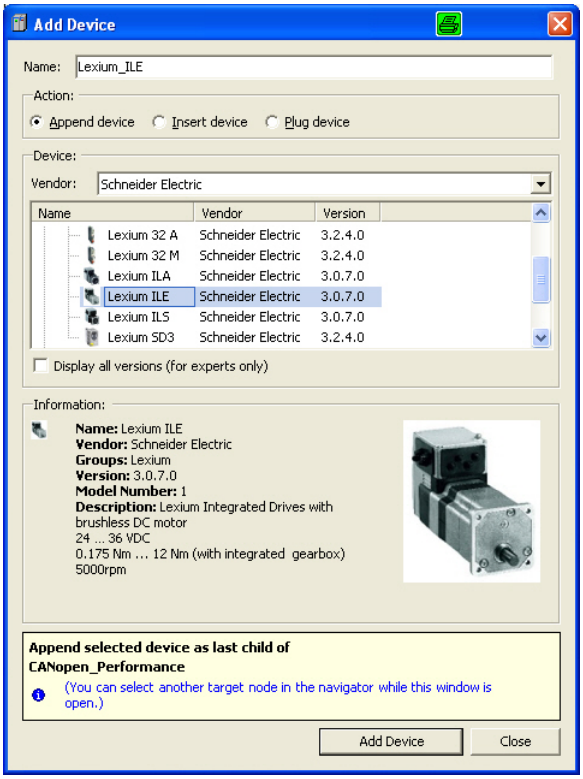
1	Right click on the **CANopen_Performance** and select **Add Device…** in the pop-up menu.	

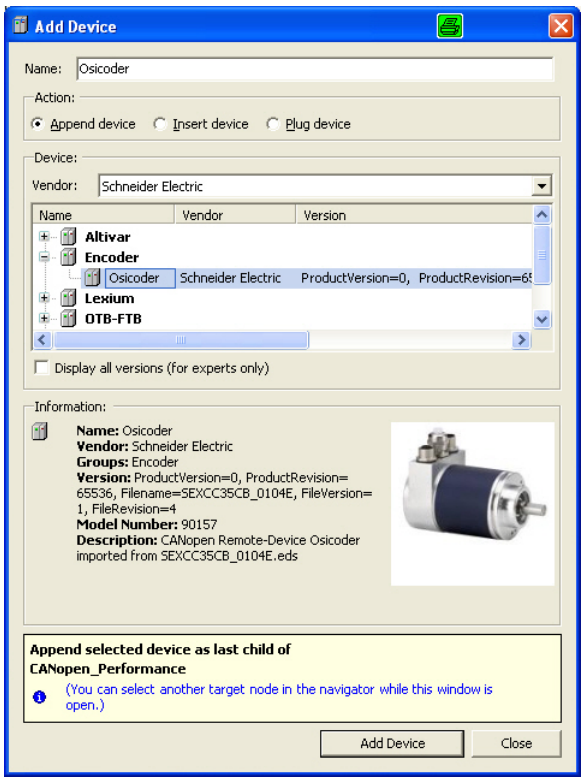
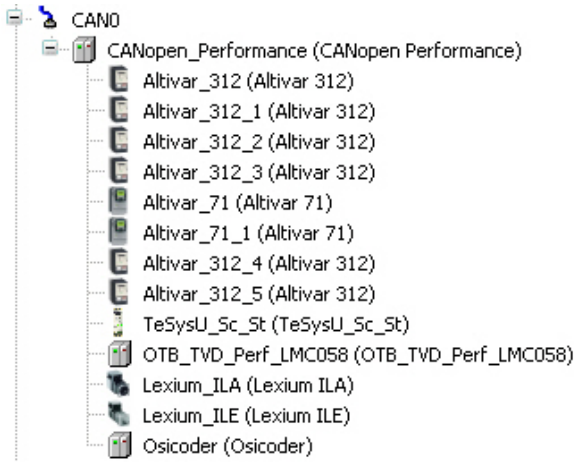
2	Select the device that you wish to connect to the CANopen bus. In this project the following devices are connected to the CANopen bus: **4x Altivar 312** **2x Altivar 71** **2x Altivar 312** **1x TeSysU_Sc_St** **1x OTB_TVD_Perf_LMC058** **1x Lexium ILA** **1x Lexium ILE** **1x OsiSense (Osicoder)** Add each device by clicking on **Add Device**. Once you have added all devices click on **Close.**	 


Add Device
Name: TeSysU_Sc_St
Action:
Append device
Insert device
Plug device
Device:
Vendor: Schneider Electric
Name
Vendor
Version
TeSysU_C_Mu_L Schneider Electric 2.0.1.3
TeSysU_C_Mu_R Schneider Electric 2.0.1.3
TeSysU_Sc_Ad Schneider Electric 2.0.1.3
TeSysU_Sc_Mu_L Schneider Electric 2.0.1.3
TeSysU_Sc_Mu_R Schneider Electric 2.0.1.3
TeSysU_Sc_St Schneider Electric 2.0.1.3
Display all versions (for experts only)
Information:
Name: TeSysU_Sc_St
Vendor: Schneider Electric
Groups: TeSys
Version: 2.0.1.3
Model Number: ---
Description: TeSys U starter or a starter-controller up to 15kW, for a 3-phase motor class 10, 0-12 or 0-32A rating with a Standard Control Unit
Append selected device as last child of CANopen_Performance
(You can select another target node in the navigator while this window is open.)
Add Device
Close

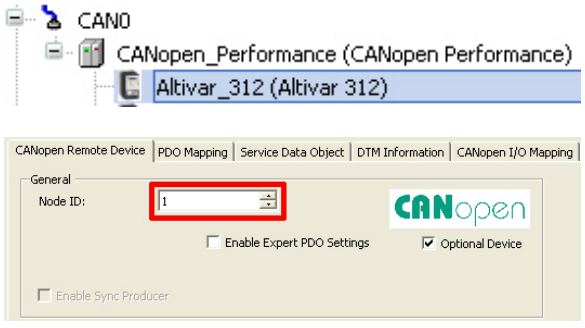

Add Device
Name: OTB_TVD_Perf_LMC058
Action:
Append device
Insert device
Plug device
Device:
Vendor: Telemecanique
Name
Vendor
Version
OTB_TVD_Perf_LMC058 Telemecanique ProductVersion=0, ProductRevision=2, Filename=
Display all versions (for experts only)
Information:
Name: OTB_TVD_Perf_LMC058
Vendor: Telemecanique
Groups:
Version: ProductVersion=0, ProductRevision=2, Filename=OTB_TVD_Perf_LMC058, FileVersion=1, FileRevision=0
Model Number: 0
Description: CANopen Remote-Device OTB_TVD_Perf_LMC058 imported from OTB_TVD_Perf_LMC058.eds
Append selected device as last child of CANopen_Performance
(You can select another target node in the navigator while this window is open.)
Add Device
Close

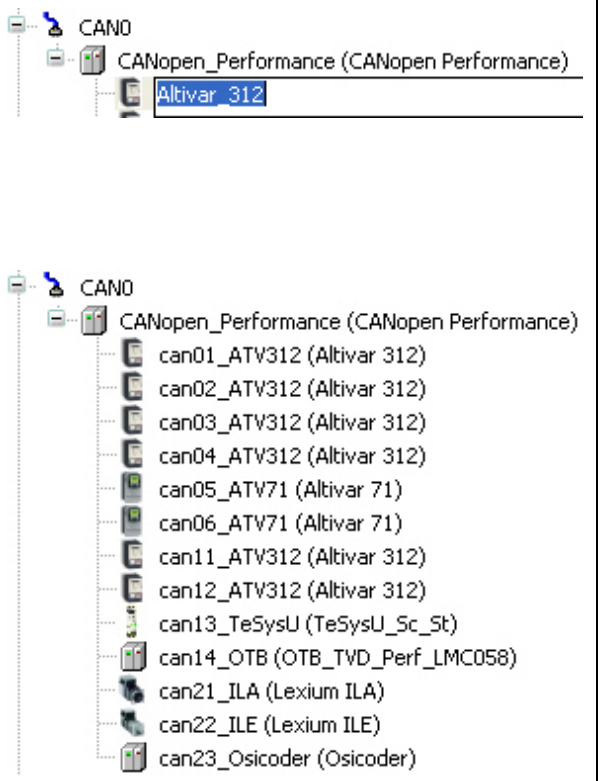

Add Device
Name: Lexium_ILA
Action:
Append device
Insert device
Plug device
Device:
Vendor: Schneider Electric
Name
Vendor
Version
Lexium 32 A Schneider Electric 3.2.4.0
Lexium 32 M Schneider Electric 3.2.4.0
Lexium ILA Schneider Electric 3.0.7.0
Lexium ILE Schneider Electric 3.0.7.0
Lexium ILS Schneider Electric 3.0.7.0
Lexium SD3 Schneider Electric 3.2.4.0
Display all versions (for experts only)
Information:
Name: Lexium ILA
Vendor: Schneider Electric
Groups: Lexium
Version: 3.0.7.0
Model Number: 1
Description: Lexium Integrated Drives with AC synchronous servo motor
24 ... 36 VDC
0.43Nm ... 0.72 Nm
5100rpm ... 7500 rpm
single/multi turn encoder
Append selected device as last child of CANopen_Performance
(You can select another target node in the navigator while this window is open.)
Add Device
Close


Add Device
Name: Lexium_ILE
Action:
Append device
Insert device
Plug device
Device:
Vendor: Schneider Electric
Name
Vendor
Version
Lexium 32 A Schneider Electric 3.2.4.0
Lexium 32 M Schneider Electric 3.2.4.0
Lexium ILA Schneider Electric 3.0.7.0
Lexium ILE Schneider Electric 3.0.7.0
Lexium ILS Schneider Electric 3.0.7.0
Lexium SD3 Schneider Electric 3.2.4.0
Display all versions (for experts only)
Information:
Name: Lexium ILE
Vendor: Schneider Electric
Groups: Lexium
Version: 3.0.7.0
Model Number: 1
Description: Lexium Integrated Drives with brushless DC motor
24 ... 36 VDC
0.175 Nm ... 12 Nm (with integrated gearbox)
5000rpm
Append selected device as last child of CANopen_Performance
(You can select another target node in the navigator while this window is open.)
Add Device
Close

		
3	The new devices are now listed in **CANopen_Performance**. To configure the devices, double click on the specific item.	

ATV312 CANopen configuration

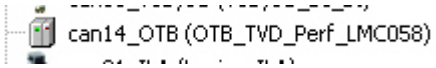
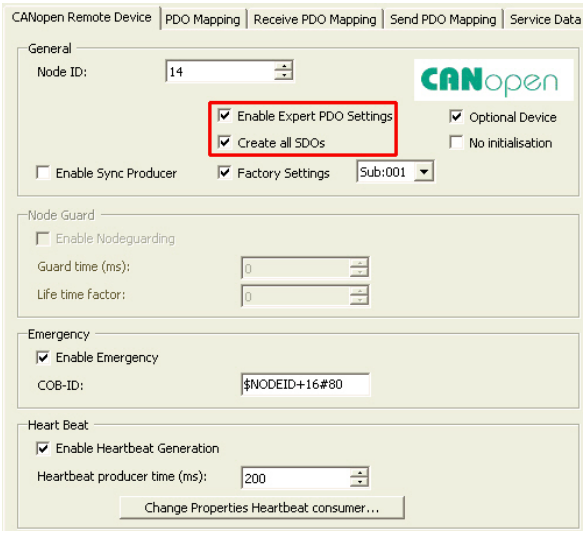
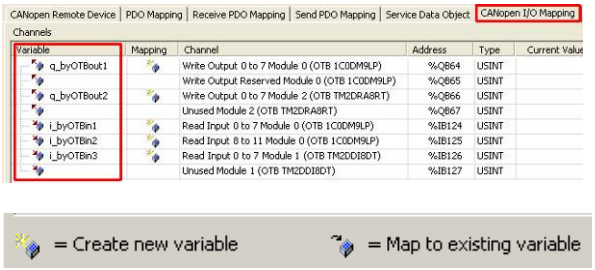
1	Double click on the **Altivar_312**. Note: In this project PLCopen EDS files are used. For this reason all PDO settings remain at their defaults. Set the **Node Id** to **1** (Node ID for the Altivar 312 is **1…4** and **11 + 12**).	

2	To change the name of the CANopen device, click on the old name. Note: The name of the device is also the AXIS REF name for the PLCopen functions used in the application program Note: The following naming is used in our example project.	

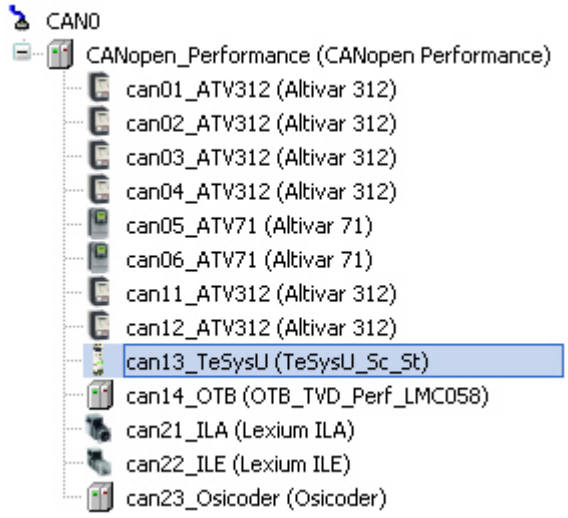
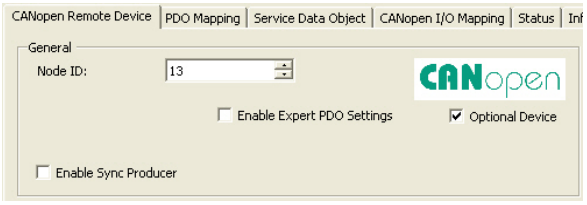
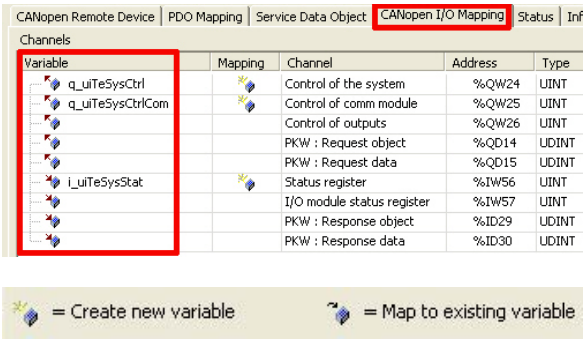
ATV71 CANopen configuration

1	The configuration is done in the same way as the ATV312 configuration. The only difference is the **CANopen (5…6)** address.

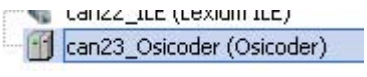
OTB CANopen Configuration

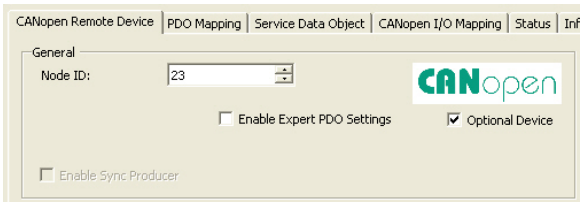
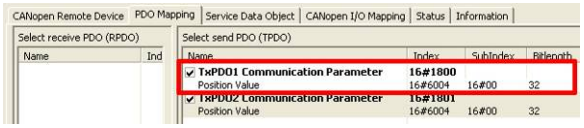
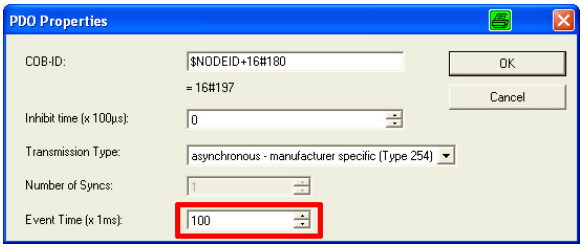
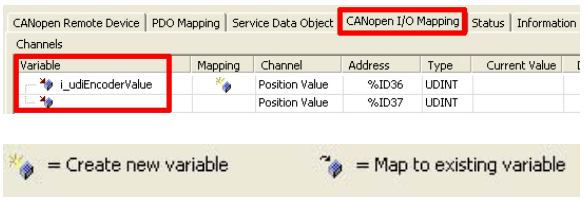
1	Double click on **OTB_TVD_Perf_LMC058** in this project it is renamed to **can14_OTB**.	
2	Change the **Node ID** to **14** Check **Enable Expert PDO Settings, Create all SDOs, Factory Settings and Enable Heartbeat Generation.** Select **200** for the **Heartbeat producer time.**	
3	In the **CANopen I/O Mapping** tab, the OTB inputs and outputs are mapped to variables. There are two ways of **Mapping:** 1.Mapping to an existing variable 2.Creating a new variable In this project **create a new variable** was chosen. This means SoMachine creates a global variable which can be used throughout the whole program. The names of the variables can be entered in the **Variable** field.	

TeSysU CANopen configuration

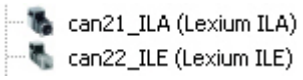
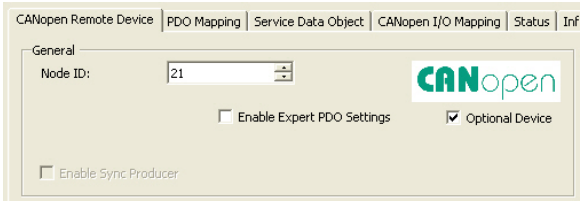
1	To configure the TeSysU double click on **can13_TeSysU**	
2	Change the **Node ID** to **13**	
3	In the **CANopen I/O Mapping** tab, the TeSysU inputs and outputs are mapped to variables. There are two ways of **Mapping:** 1.Mapping to an existing variable 2.Creating a new variable In this project **create a new variable** was chosen. This means SoMachine creates a global variable which can be used throughout the entire program. The names of the variables can be entered in the **Variable** field.	

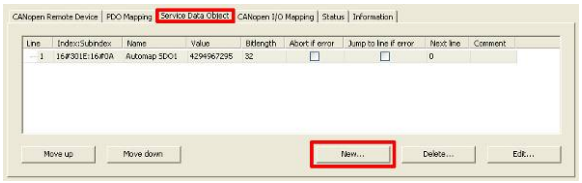
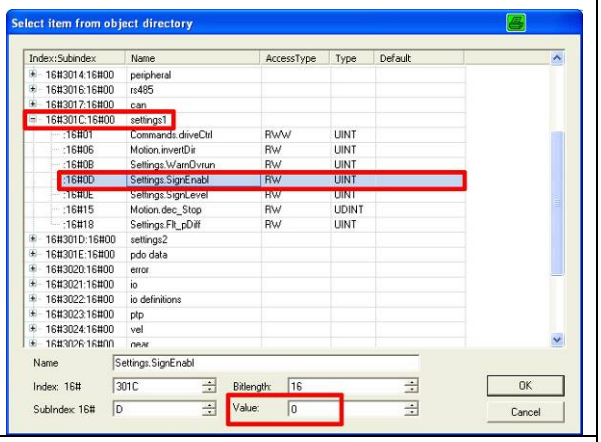
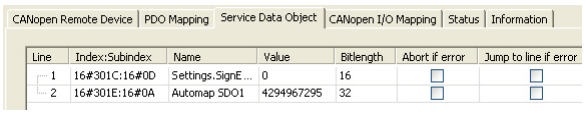
OsiSense (Osicoder) CANopen configuration

1	To configure the OsiSense (Osicoder) double click on **can23_Osicoder**.	

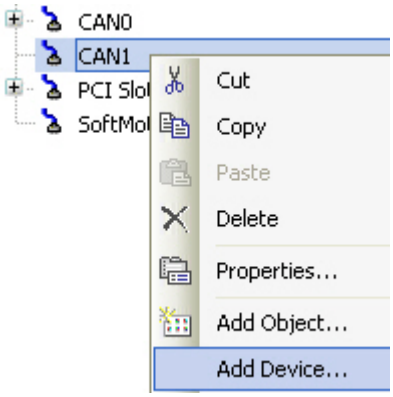
2	Change the Node ID to **23** and select the checkbox **Enable Expert PDO Settings**	
3	Go to the **PDO Mapping** tab and select by double click the **TxPDO1**	
4	Set the **Event Time** to a value greater 0. In this project it is **100 ms.** If the value is 0, the OsiSense (Osicoder) will not send any data.	
5	In the **CANopen I/O Mapping** tab, the position value of the OsiSense (Osicoder) is mapped to a variable.	

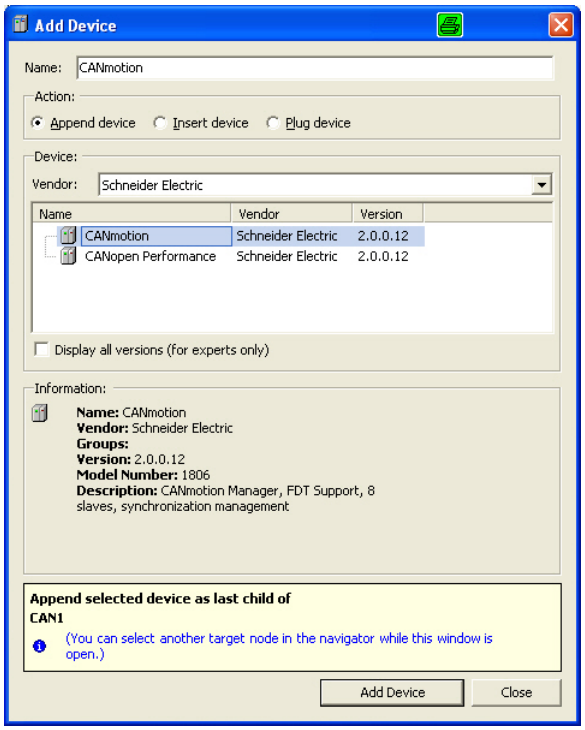
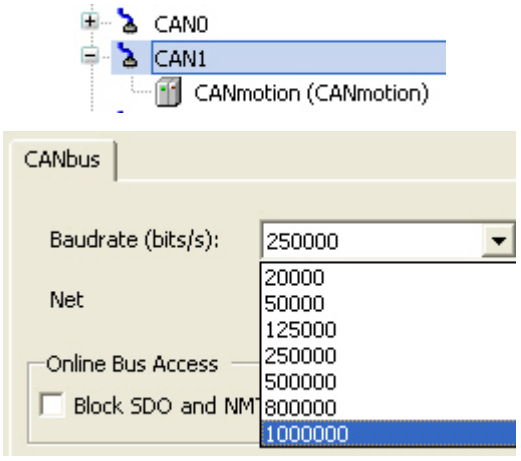
Integrated drive Lexium ILx CANopen configuration

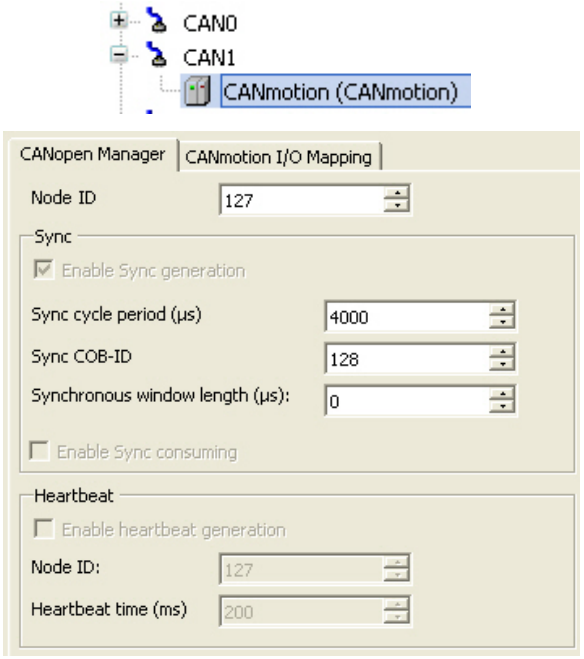
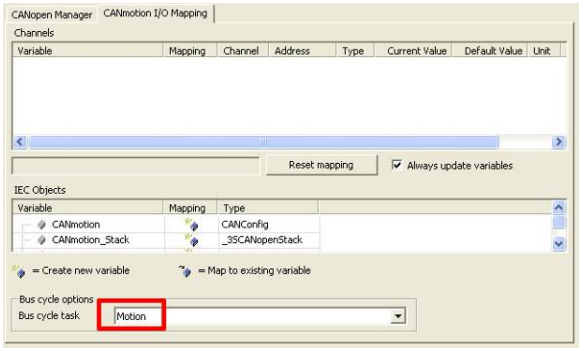
1	To configure the Lexium ILx double click on **can21_ILA**. and for the second Lexium ILx double click on **can22_ILE**. **Note:** In this project Motion EDS files are used. For this reason all PDO settings remain at their defaults.	
2	Set Node ID to **21.** For the 2nd ILx set Node ID to **22**. And checkmark **EnableExpertPDOSettings.**	

3	Go to the **Service Data Object** tab and click **New…**	
4	In the **Select item from object directory** dialog select **16#301C:16#00 | Settings1 :16#0D Settings.SignEnabl** set **Value** to **0** and click **OK**	
	NOTE: In our example application we set the Settings.SignEnabl to 0 because we use the modulo motion mode (endless movements). If your application requires the end of travel limits then set the Settings.SignEnabl to 1. Verify that your application doesn't require these signals before disabling them.	
5	The new SDO is now in the **Service Data Object** tab.	

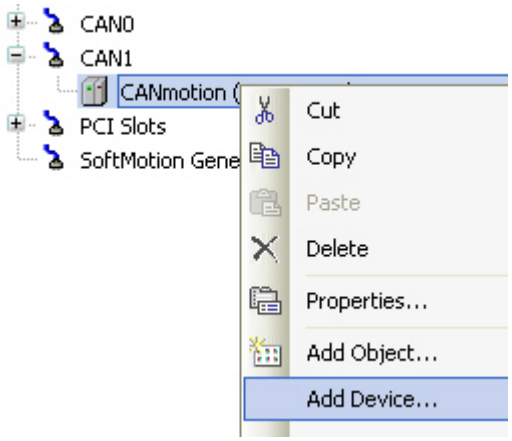
Add the CANmotion bus

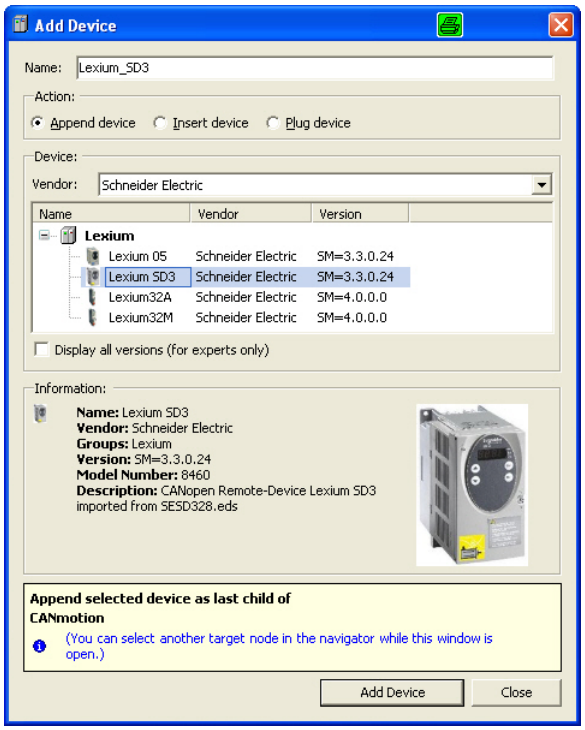
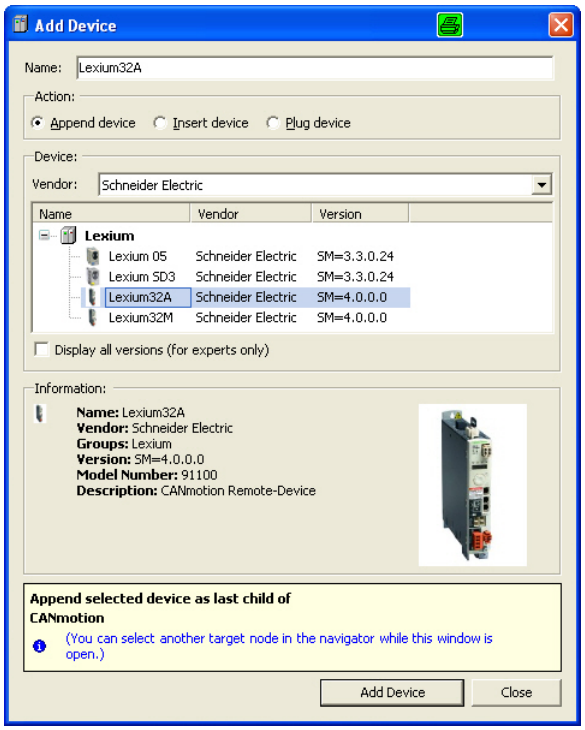
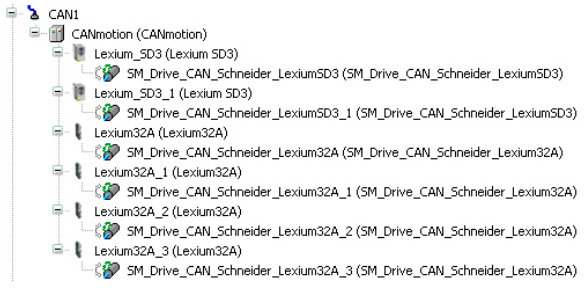
1	Right click on **CAN1** and select: **Add Device...**	

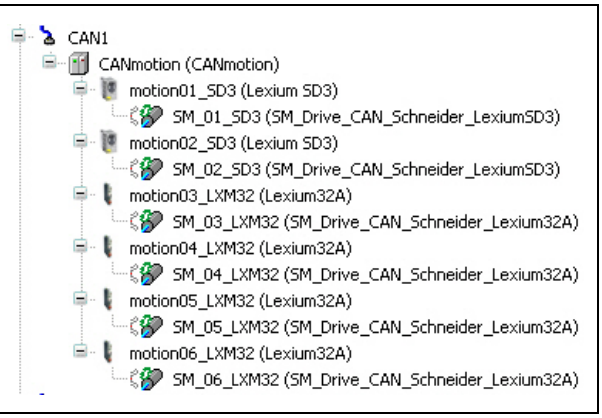
2	Select: **CANmotion** Click on **Add Device.**	
3	Double click on **CAN1** and select for **Baudrate (bit/s) 1000000** from the pull down menu.	

4	Double click on **CANmotion** In the tab **CANopen Manager** the sync cycle period can be changed. Now it is set to 4ms = **4000** µs This is also the time base for the task configuration.	
5	In the **CANopen I/O Mapping** tab the **Bus cycle task** is linked to **Motion**.	

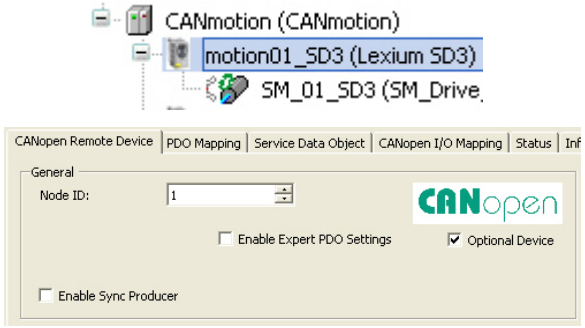
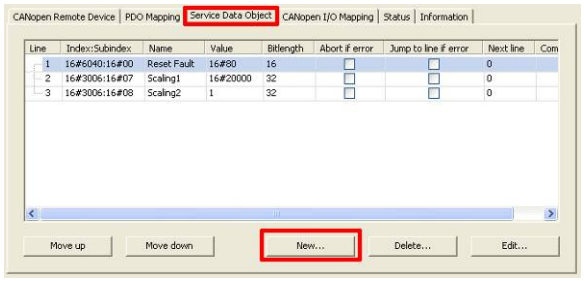
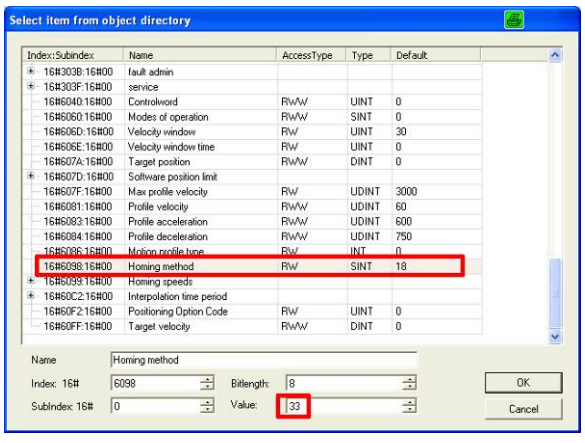
Add CANmotion Devices

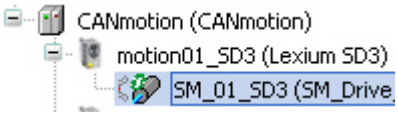
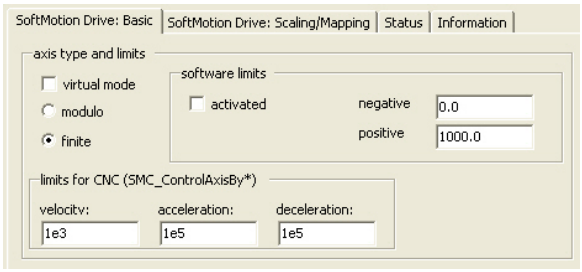
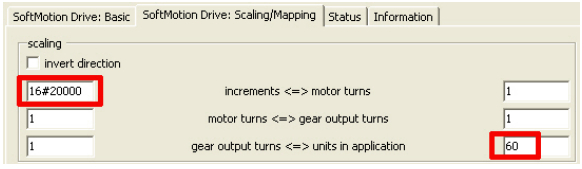
1	Right click on the **CANmotion** and select **Add Device…** in the pop-up menu.	

2	Select the device they connected to the CANmotion bus. In this project: **2x Lexium SD3** **4x Lexium32A** Add each device by clicking on **Add Device**. Once you have added all devices click on **Close.**	 
3	The new devices are now listed under **CANmotion**. To configure the devices, double click on the specific item.	

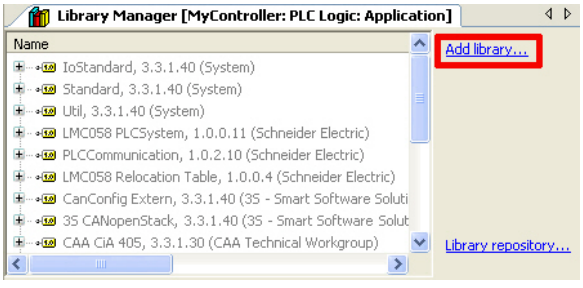
4	The automatically generated names can be changed by selecting the name.	

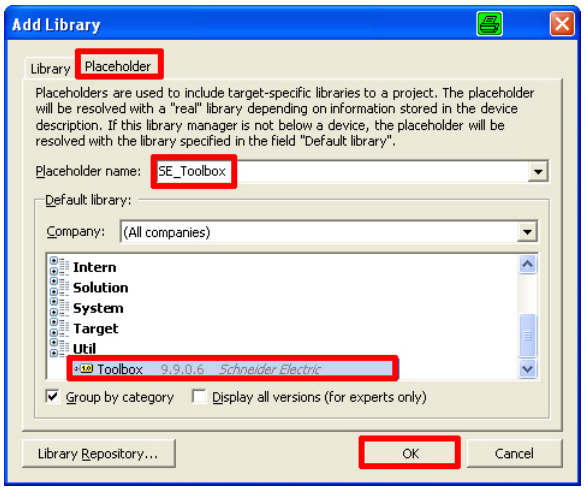
CANmotion device configuration

1	Double click on the communication section of the first device **motion01_SD3**. Note: In this project SoftMotion EDS files are used. For this reason all PDO settings remain at their factory settings. Set the **Node Id** to **1** (Node ID for the SD3 is **1…2** and for LXM32 is **3…6**).	
2	The factory settings of the axis can be changed at the tab **Service Data Objects**. If one data is missing click on **New..** .	
3	Then select the needed item. In this case we select the **Homing method**. Change the value to **33** (index pulse neg. direction). Press **OK** to add this to the list.	

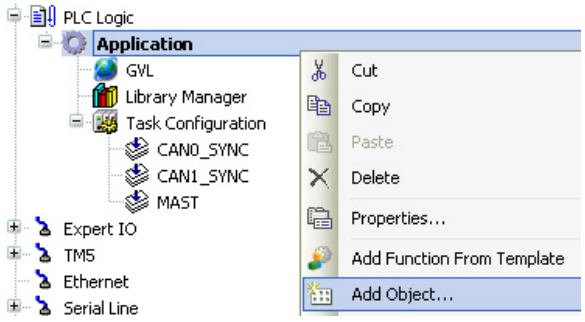
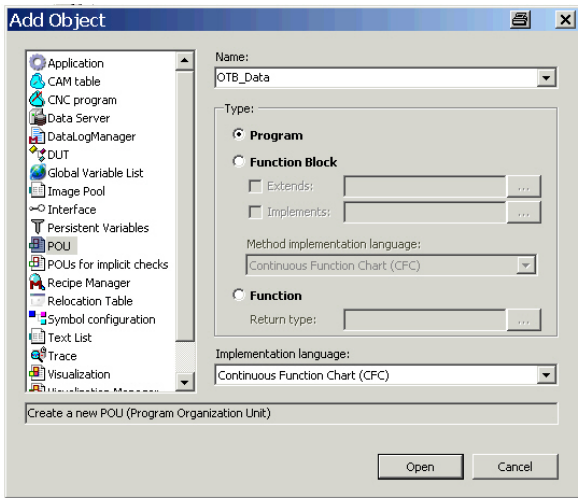
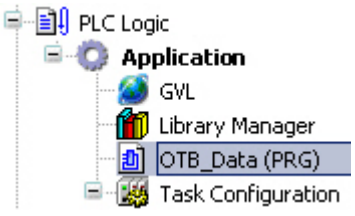
4	Double click on motion section of the first device **SM_01_SD3**. Note: The name of the axis is also the AXIS REF name for the SoftMotion functions used in the application program.	
5	The first tab of the axis **SoftMotion Drive: Basic** provides several boxes for the configuration of the basic settings for the inserted device. For more detail, please see the online help of SoMachine.	
6	The **SoftMotion Device: Scaling/Mapping** tab provides the adjustment of the physical setting of the axis In the exemplary configuration the drive creating 2^{17} = 131072 = **20000_{hex}** increments for one rotation. And the technical unit is set to **60.** Now the speed can be given in RPM/min to the axis.	

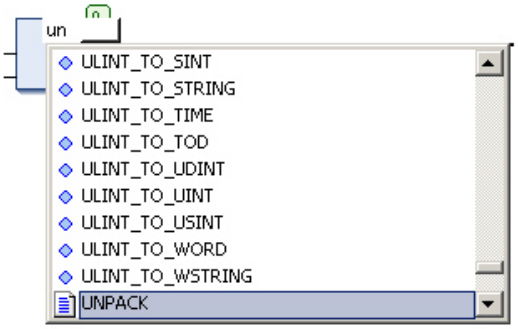
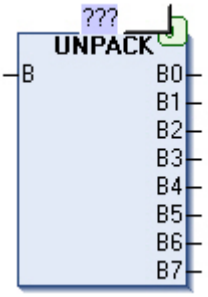
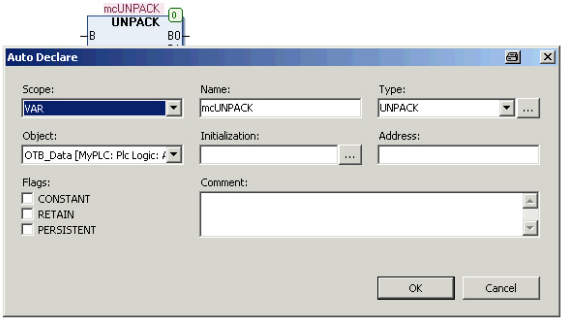
Add Toolbox Library

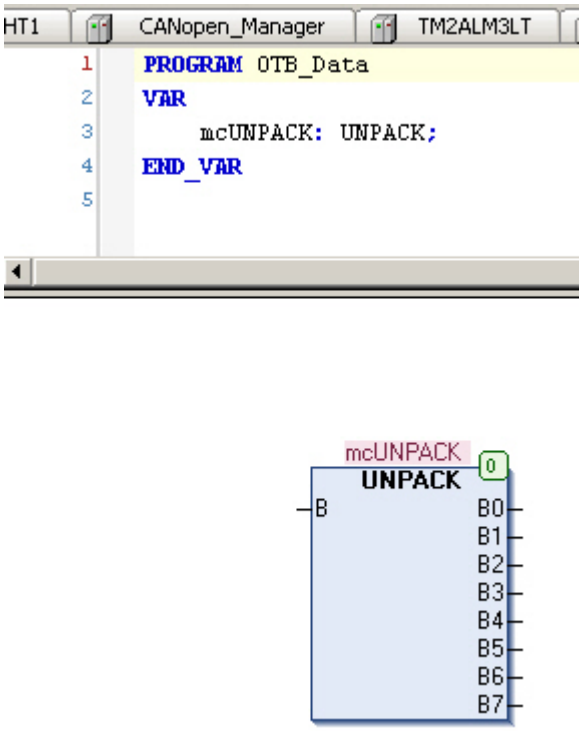
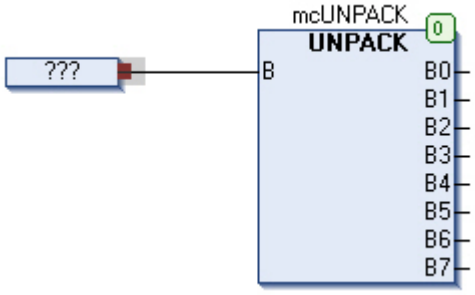
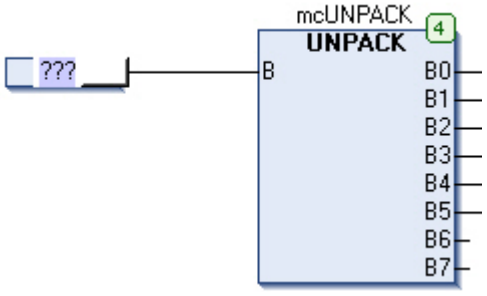
1	To use the additional functions you need a special library. These can be inserted by double clicking on **Library Manager.**	
2	In the Library Manager click on **Add library…**	

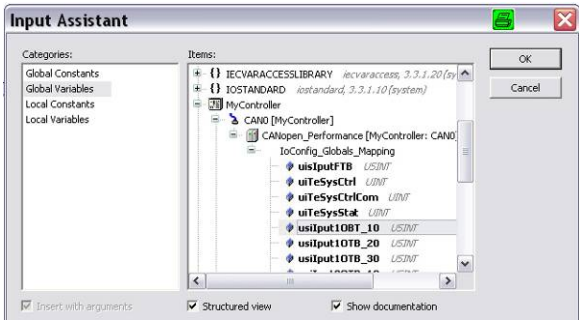
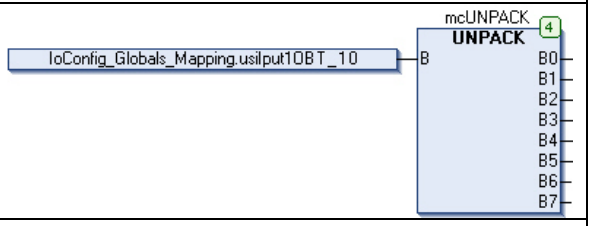
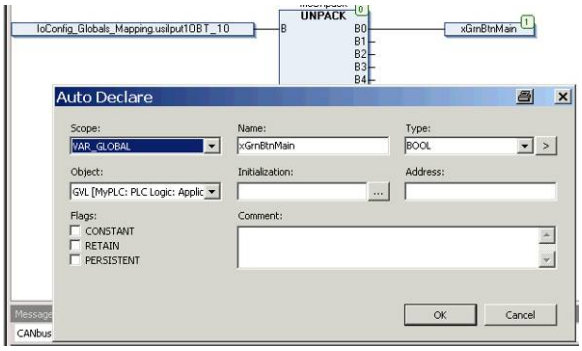
3	In the **Add library** dialog on the **Placeholder** tab select: **Placeholder name→** **SE_Toolbox** and as **Default Library** **Util → Toolbox** for the **Toolbox** lib. In each case, click on **OK** to add the library.	
4	If you need to add more libraries repeat steps 1 to 3.	

Add a POU (example)

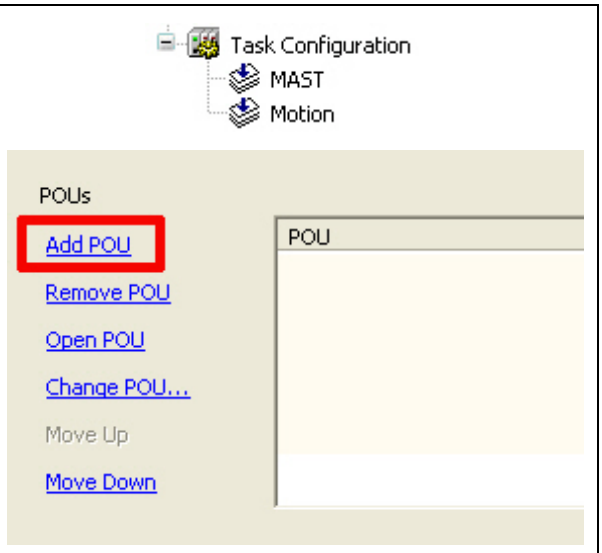
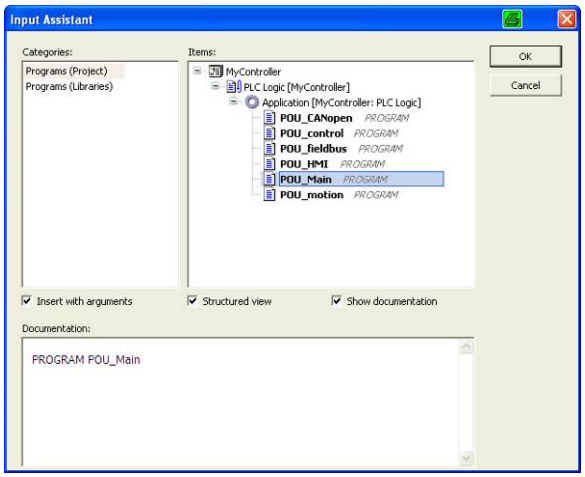
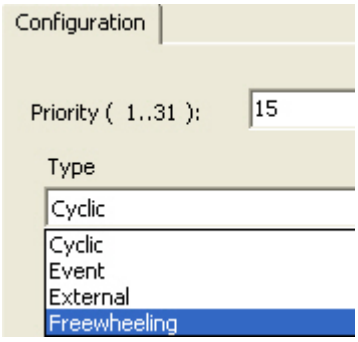
1	Right click on **Application→** **Add Object…**	
2	Select **POU** and enter a **Name (for example OTB_Data).** As **Type** select **Program** and as **Implementation language** select **CFC.** It is possible to select all the IEC languages and to generate functions and function blocks. Click on **Open.**	
3	The new **POU OTB_Data** is now visible under **Application.** Double click on **OTB_Data** to open it.	

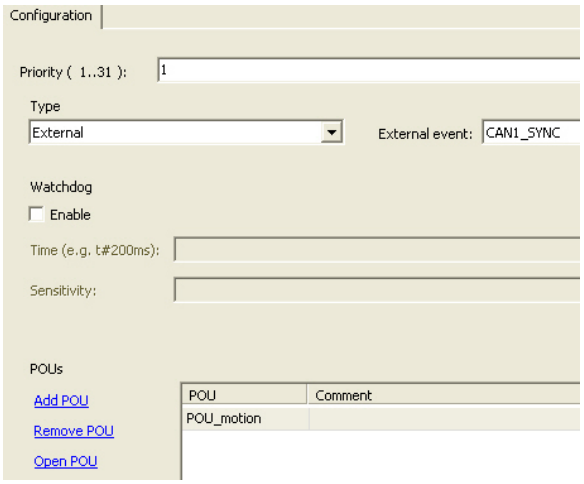
4	The upper frame displays the declaration section. The lower frame is for programming. On the right side is the **ToolBox** window**.** Use drag and drop with the toolbox to place example templates in the programming section.	
5	Once you have placed a template in the programming section click on the **???**.	
6	Start typing the name for a function or function block. When the first letters are typed a pop-up menu opens with hints for the name. In this example an **UNPACK** FB was chosen. The UNPACK FB converts bytes to bits.	
7	To instantiate the FB click the **???** …	
8	… and type the name (for example mcUNPACK). Now press Enter. The **Auto Declare** dialog opens. Here click on **OK** to create the instance. Note: If you wish to add a comment you can do this in the **Comment** box**.**	

9	The new FB UNPACK is instantiated in the declaration section of the OTB_Data.	
10	To connect a variable to an input place an input field from the **ToolBox** on the input side of the FB and connect the input box to the FB input by clicking on the red field and dragging it to the input of the FB.	
11	Click the input field and press **F8.** The **Input Assistant** is displayed.	

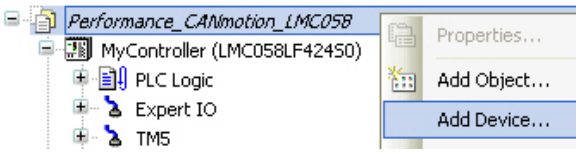
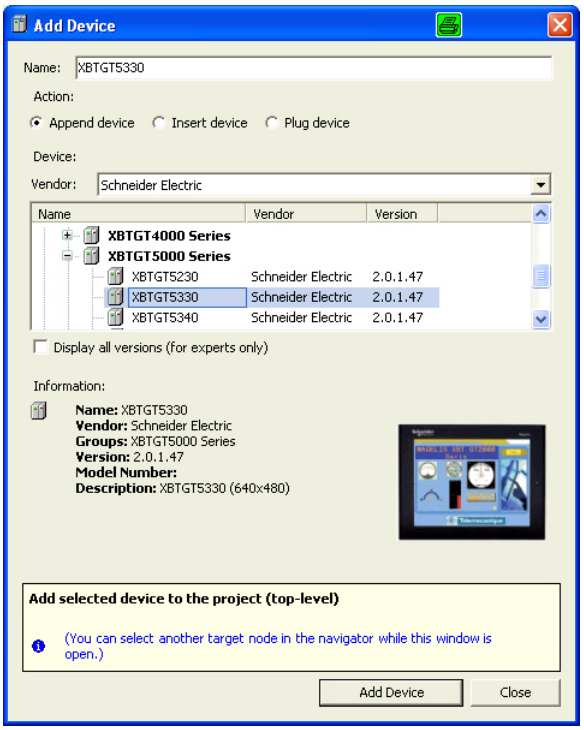
12	In the **Input Assistant** select **Global Variables→** **MyController→** **CAN0→** **CANopen_Performance→** **IOConfig_Globals_Mapping** and then the variable. In this project the variable is the first input byte of the OTB. Click on **OK.**	
13	This image shows the FB with the connected input.	
14	Output selection is similar to input definition, but here we create a new variable. Click the output field, type in the name of the variable and press Enter. In the **Auto Declare** dialog select the **Scope**, the **Name** and the **Type.** In this example **VAR_GLOBAL** is chosen as **Scope.** When finished click on **OK.**	
15	The **VAR_GLOBAL** variables are located in the **GVL** folder. All variables located in this folder can be accessed throughout the entire **Application**. If the variables are located in the POU, they can only be accessed by the POU (local variables).	

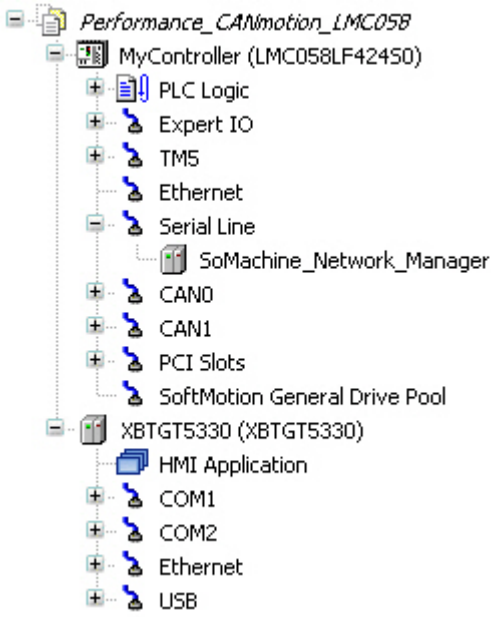
Task Configuration

1	Before you can start working with the new POU you have to add it to a task. Here, the POUs are added to the **MAST** task. To do this double click the **MAST** task and click on **Add POU.** Note: If a POU is not included in a TASK, or added in another POU, which is cyclically invoked, it will not be cyclically invoked.	
2	Select in **Categories Programs (Project)** and select the POU in the **Items list.** Then click **OK**. Note: You have to add all POUs in the program.	
3	Now the POU is in the **MAST** task. In the upper part of the **MAST** task configuration you can change the **Type** of the task. In this project it is **Freewheeling.**	

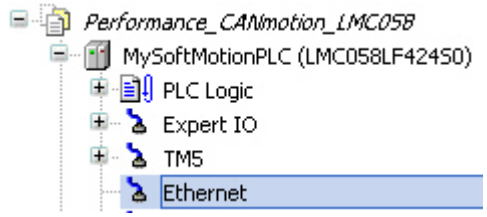
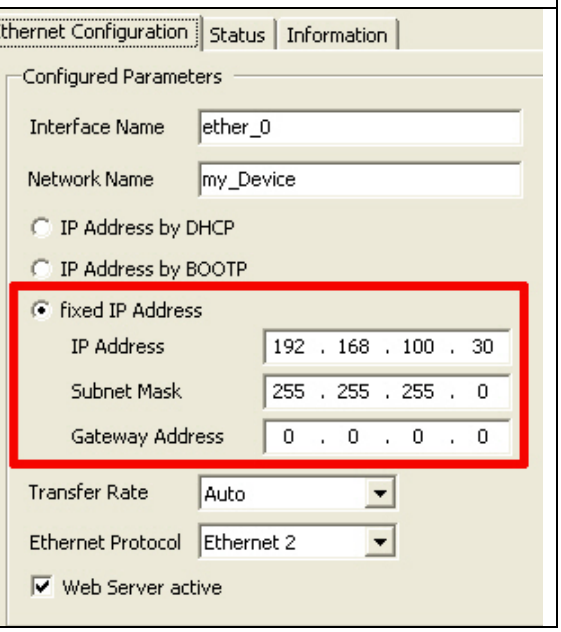
4	To add a POU to the motion task double click the **Motion** and click on **Add POU.** Select the POU like in step 2. Note: This task is linked to the motion configuration. The time base, in this application is set to 4ms. See at “Add the CANmotion bus” and step 4.	

Add Vijeo Designer HMI

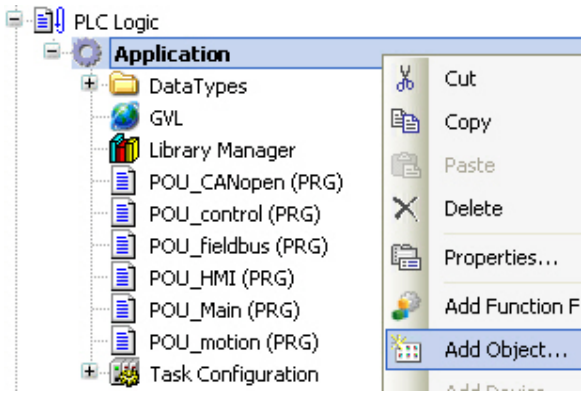
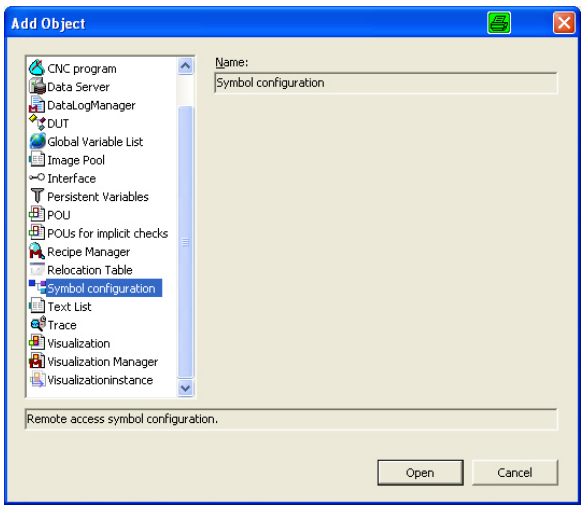
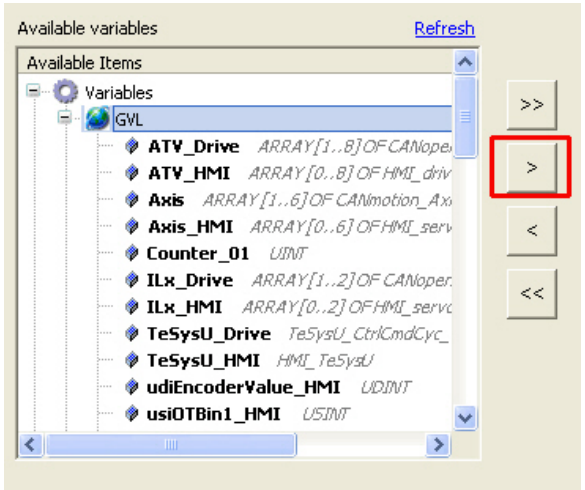
1	To add a Vijeo Designer HMI unit to the project right click on **Performance_CANmotion _LMC058** and select **Add Device…**	
2	In the **Add Device** select **Schneider Electric** as **Vendor.** Click on: **Magelis HMI->** **XBTGT5000 Series->** **XBTGT5330.** Click on **Add Device.**	

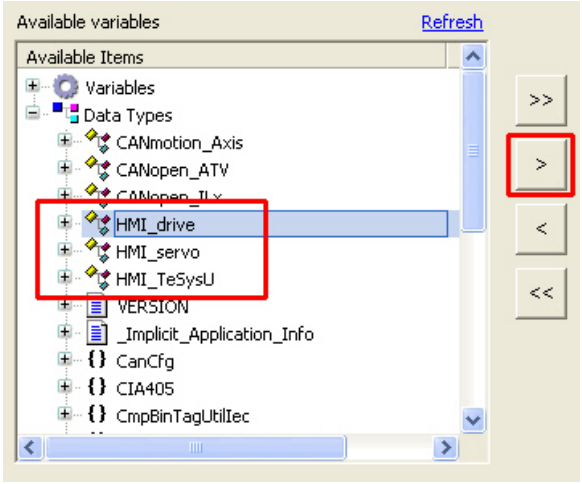
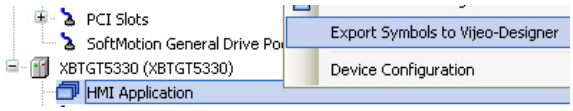
3	The new **XBTGT5330** is now listed in the configuration. Note: With this **XBTGT5330,** the Program Vijeo Designer opens and you can start programming. (See chapter HMI)	

Ethernet settings

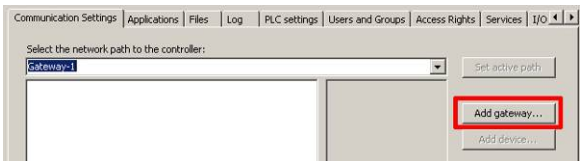
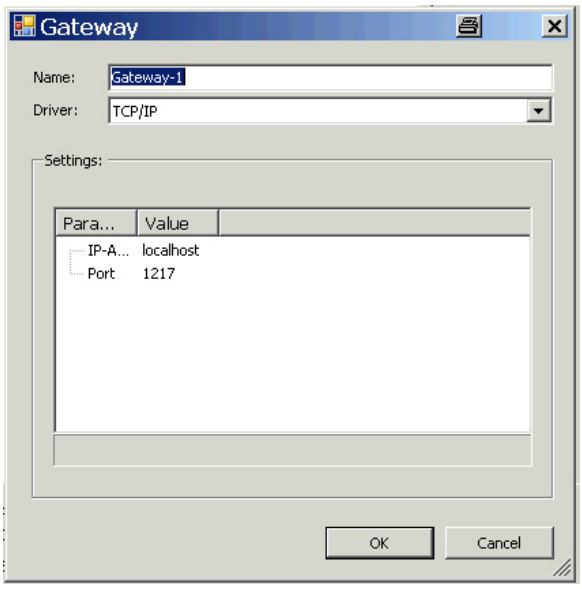
1	To change the Ethernet settings double click **Ethernet**	
2	Check the **fixed IP Address** box and set an **IP Address** (In this project **192.168.100.30**) and a **Subnet Mask** (In this project **255.255.255.0**) Note: The USB cable **TCSXCNAMUM3P** must be used for the initial project download. For subsequent downloads, the Ethernet connection can be used.	

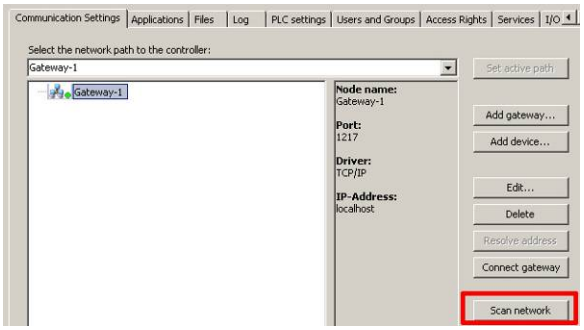
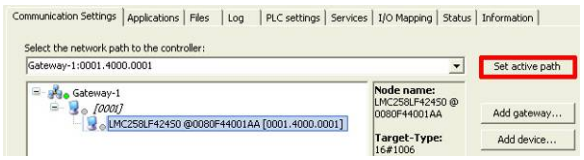
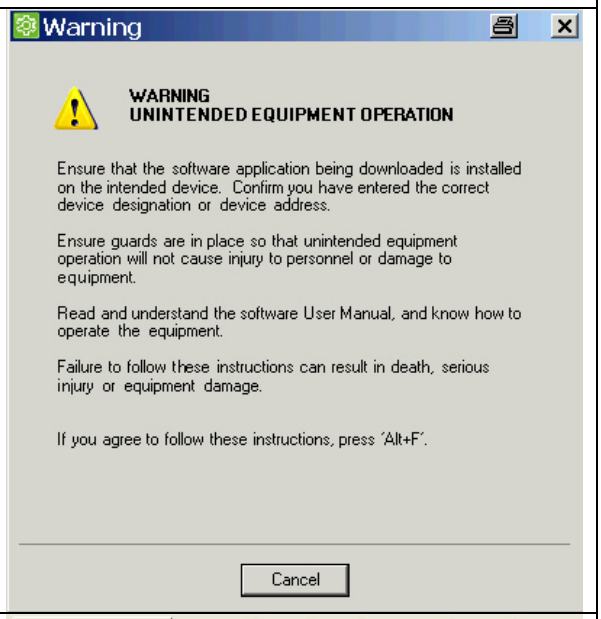
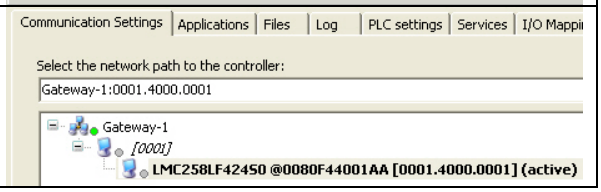
Configure Controller <-> HMI Data Exchange

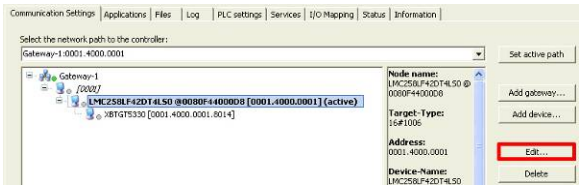
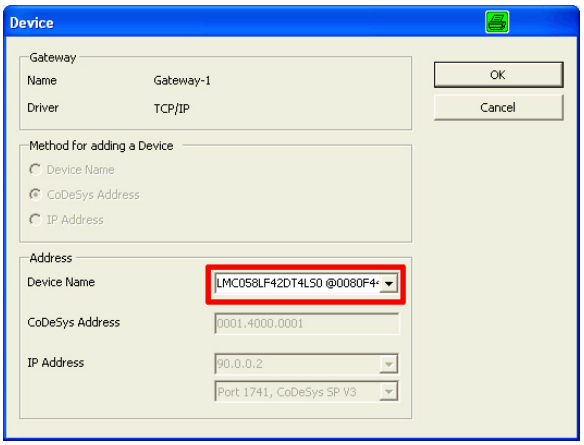
1	In the browser right click on: **Application →** **Add Object…**	
2	Select **Symbol configuration** in the **Add Object** dialog**.** Click on **Open**.	
3	Click on **Refresh** in the now open **Symbol configuration.** The left window shows the **Available Items**. The right window shows the **Selected Variables** which can be used in the HMI.	
4	All Variables created in the user program are shown in the **Available variables** list. In this project all variables are global variables and are located in the GVL folder. To export variables to the HMI, select **GVL** and click on **>** .	

5	In addition for structured variables you need to select corresponding data types. Go to **Data Types** and select one by one the items and click on **>** .	
6	To export the selected variables to Vijeo Designer right click on **HMI Application** and select **Export Symbols to Vijeo-Designer.**	

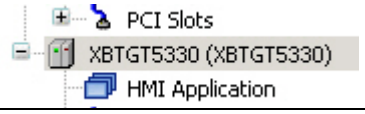
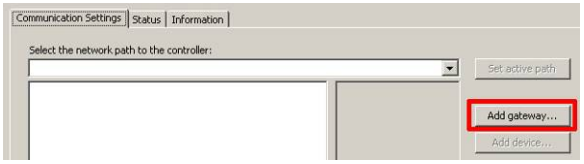
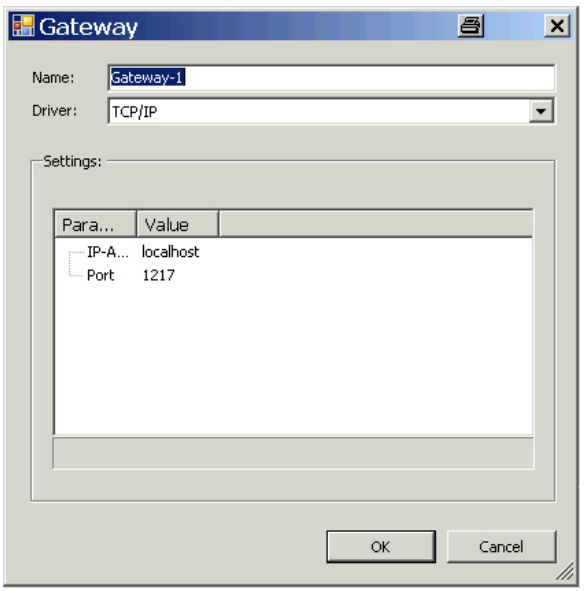
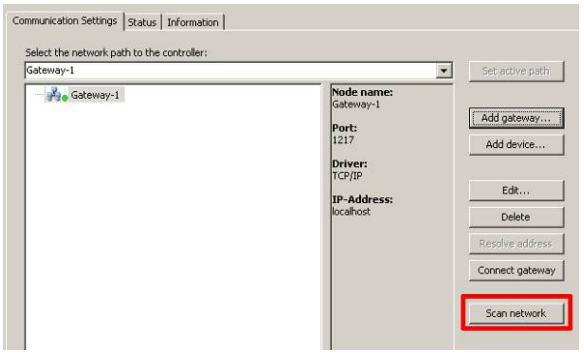
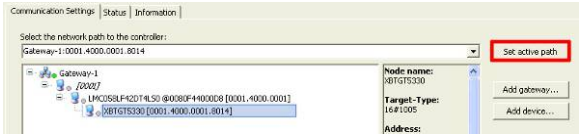
Communication Setting Controller <-> PC

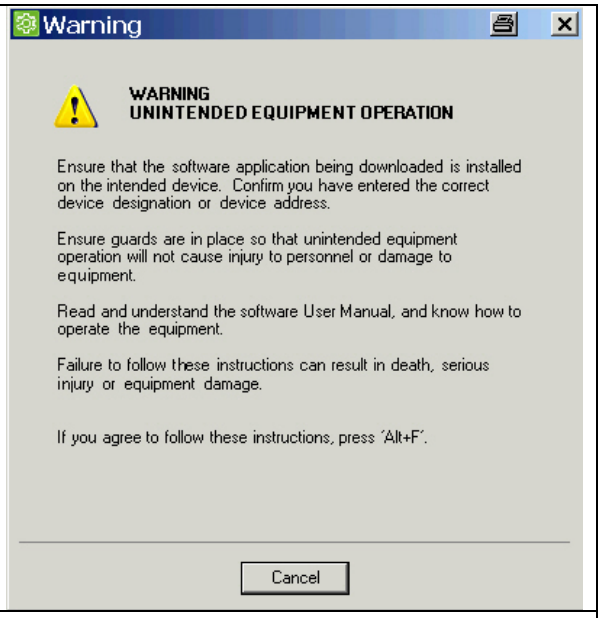
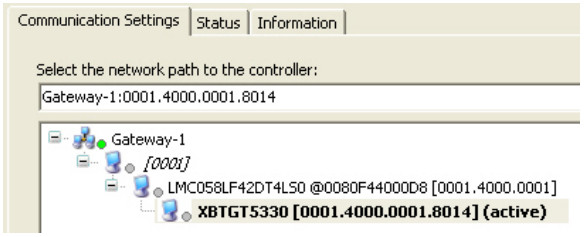
1	To configure the communication gateway double click on **MyController**.	
2	On the **Communication Settings** tab click on: **Add gateway...**	
3	Keep the default settings and click on **OK.**	

4	Select **Gateway-1** and click on **Scan network.**	
5	When the scan is finished, the devices are listed under the **Gateway-1**. Select the appropriate controller and click **Set active path.**	
6	A warning pop-up window opens. Read the warning and once you have fulfilled the instruction, continue.	
7	The used controller is now marked as **active.**	

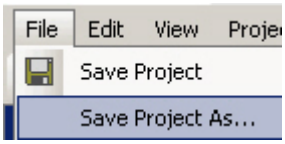
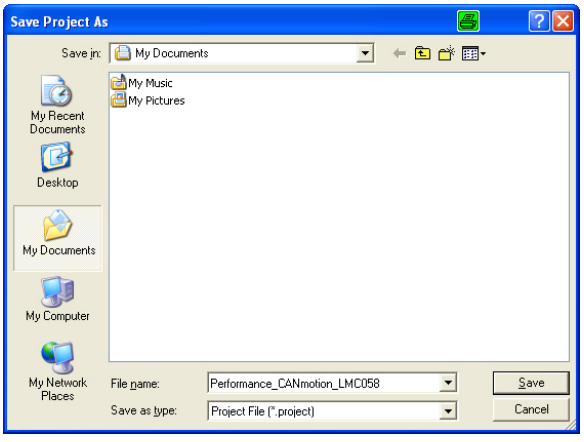
8	**NOTE:** Every LMC058 has a unique MAC address that is a part of the default name (in this case: **@0080F44000D8**). If you would like to change the default name of your controller: click on **Edit…** In the displayed pop-up window go to the **Device Name** field and enter the new unique name for your controller. In our example we keep the factory setting name.	 

Communication Setting HMI <-> PC

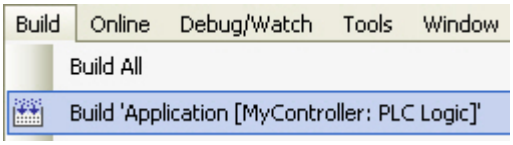
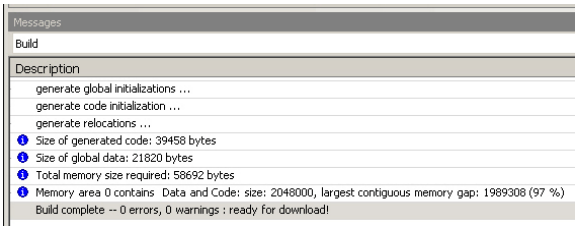
1	To configure the communication gateway double click on **XBTGT5330**.	
2	On the **Communication Settings** tab, click on **Add gateway.**	
3	Retain the factory settings and click **OK.**	
4	Select **Gateway-1** and click **Scan network.**	
5	When the scan is finished, the devices are listed under the **Gateway-1**. Select the appropriate HMI and click on **Set active path.**	

6	A **Warning** pop-up window opens. Read the warning and once you have fulfilled the instruction, continue.	
7	The selected HMI is now marked as **active.**	

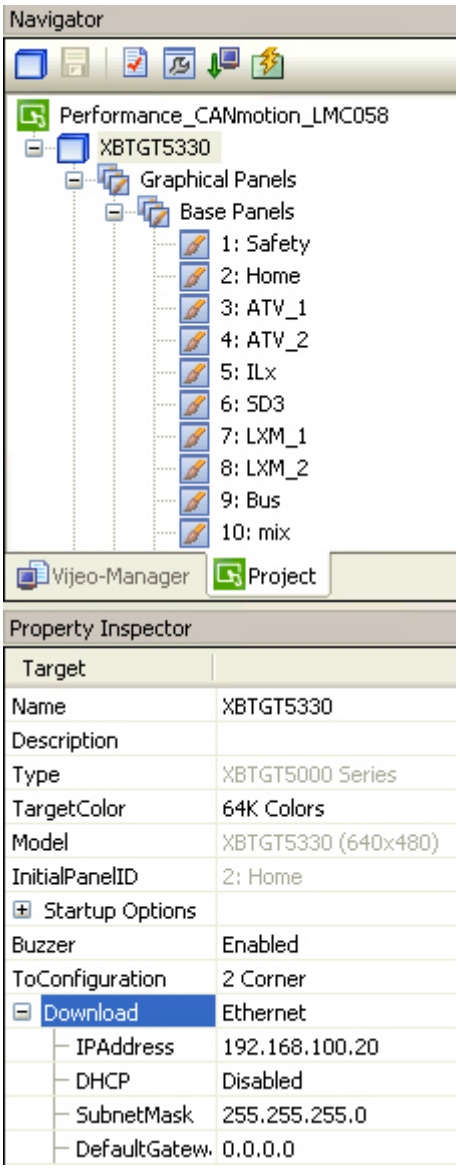
Save the Project

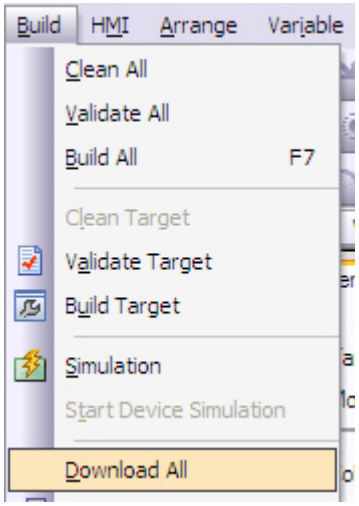
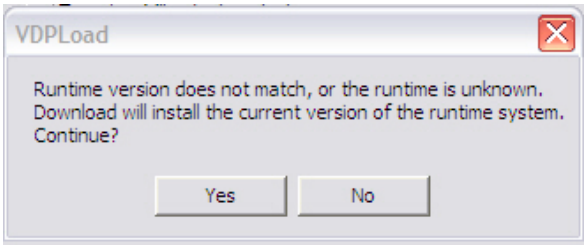
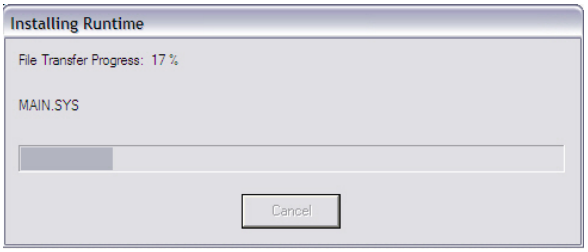
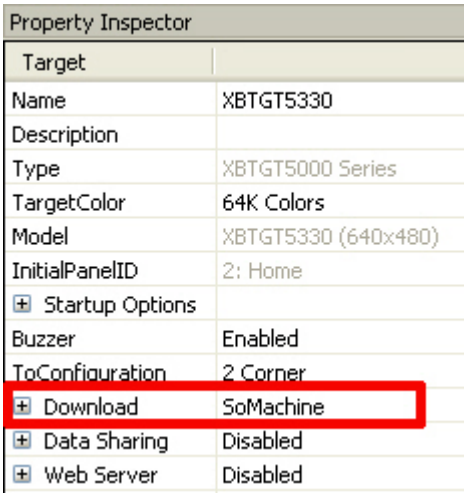
1	To save the project and change the name click **File->Save Project As…**	
2	Enter the **File name** and click on **Save.** Note: As default the project is saved under My Documents.	

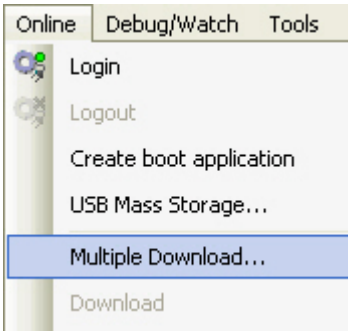
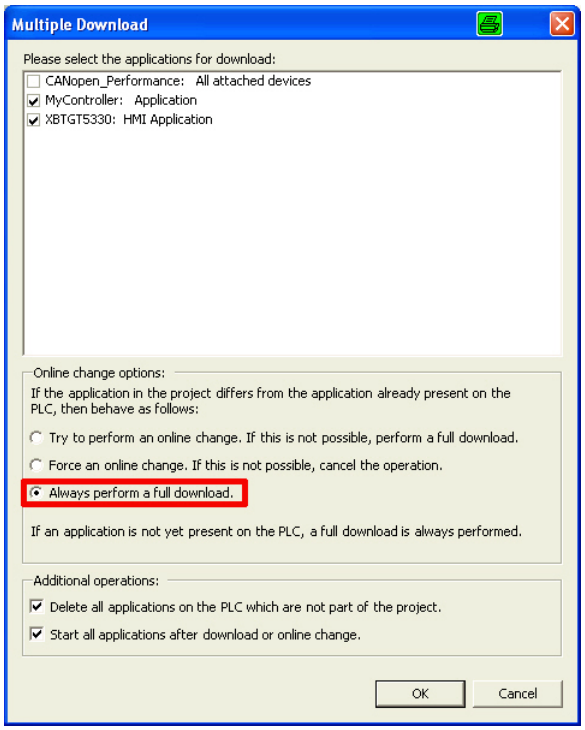
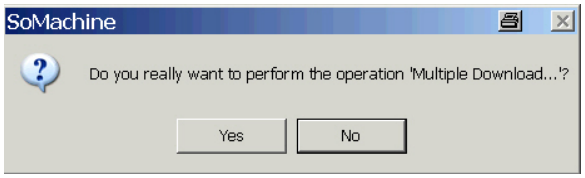
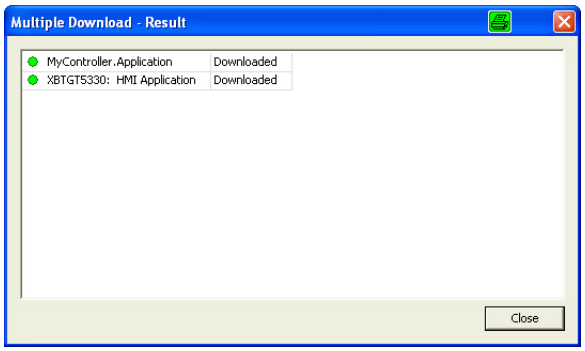
Build Application

1	To build the application click on **Build** → **Build 'Application [MyController: PLC Logic]'.** Note: If you wish to build the entire project (HMI and Controller) click **Build All**	
2	After the build you are notified in the **Messages** field as to whether the build was successful or not. If the build was not successful there will be a list in the **Messages** field.	

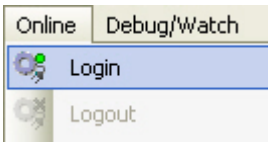
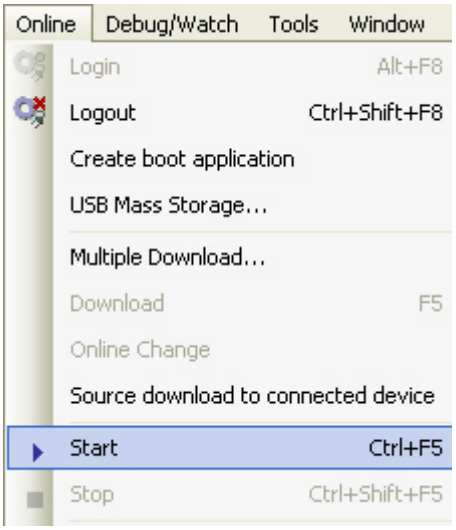
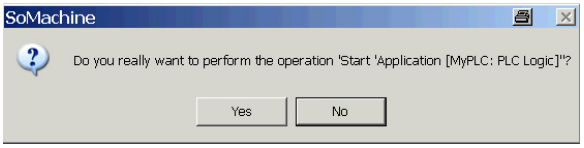
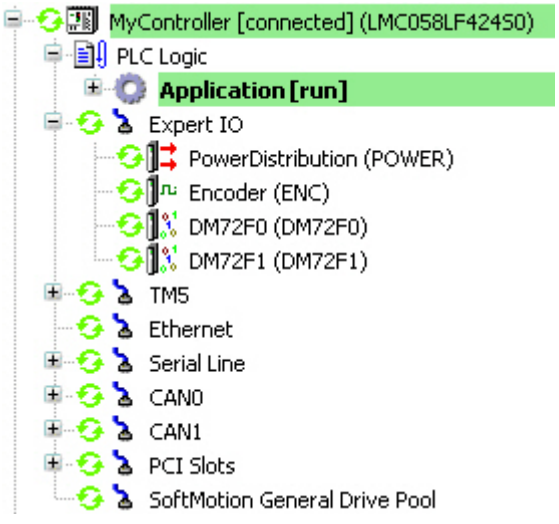
Download the Controller and HMI project

1	**NOTE:** For the initial download, the Magelis HMI requires the latest version of the runtime kernel and the Controller address. This is accomplished by using Vijeo Designer for the initial download This first download is described in the following steps. If this is not the initial Magelis HMI download go direct to step 7.	
2	In Vijeo Designer, under the **Property Inspector** select **Download** via **Ethernet.** Note: The PC should be connected with the HMI via the Ethernet switch **TCSESU053FN0.** The IP address of the target machine can be set by using the Offline Configuration Menu of the XBTGT HMI. For more detail, please see the online help of Vijeo Designer.	

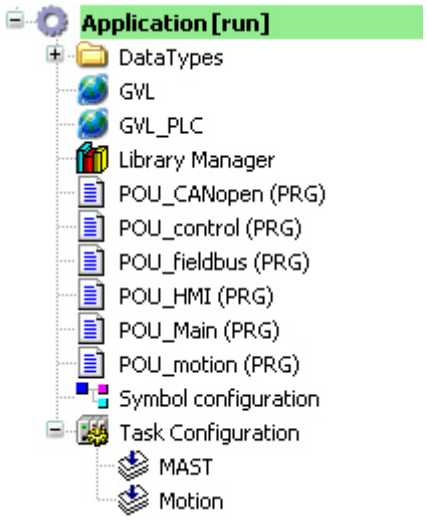
3	Select **Build** → **Download All.**	
4	The **VDPLoad** dialog box shows; Runtime versions do not match. Start the download of the new version by clicking on **Yes**.	
5	The actual state of the download is displayed.	
6	After the download, change the **Download** option back to **SoMachine.**	

7	To download the project to the controller and the HMI click **Online →** **Multiple Download …**	
8	Check the boxes for the controller **MyController,** the HMI **XBTGT5330** and select **Always perform a full download.** Click on **OK**.	
9	Click **Yes** if you want to do so.	
10	The results of the download to the PLC and the HMI are displayed in the **Multiple Download – Result** window**.** Click on **Close** to close the results window**.**	

Login to Controller

1	To login to the controller select **Online → Login**	
2	To start the new Application select **Online → Start**	
3	If you want to start the application click on **Yes.**	
4	If everything is running properly the devices and folders are marked in green otherwise they will be marked in red.	

Application overview

1	The picture on the right shows the structure of the **Application**.	

HMI

Introduction

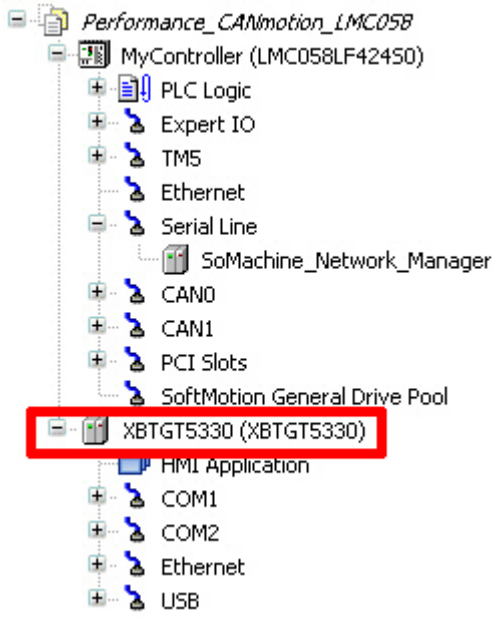
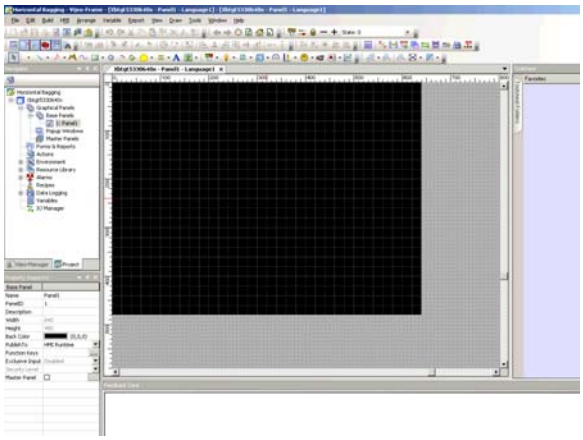
This application uses a Magelis XBTGT5330 HMI. This HMI device communicates via the SoMachine protocol over Ethernet with the controller. The HMI is programmed using the software tool **Vijeo Designer** (delivered with SoMachine), described briefly in the following pages. For the connection between the controller and the HMI use the cable **Ethernet cable 490NTW00005**.

NOTE:
The Vijeo Designer Tool is opened and closed via SoMachine software. For more information see chapter
Controller: Add Vijeo Designer HMI

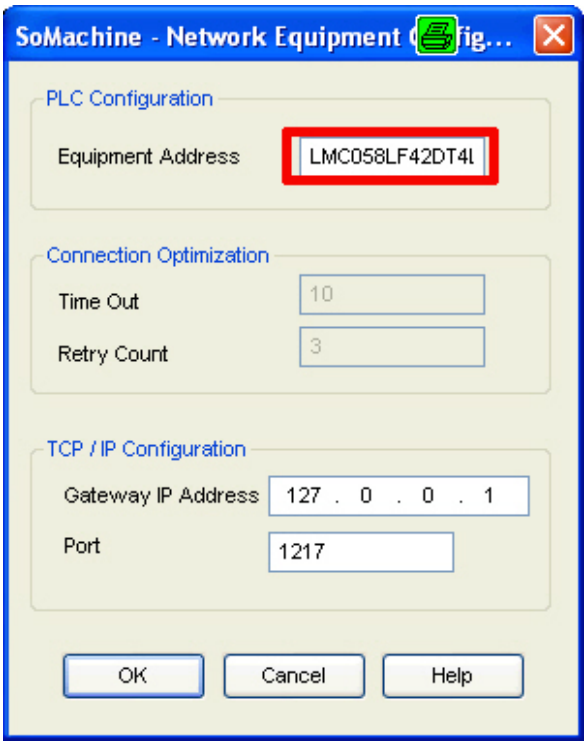
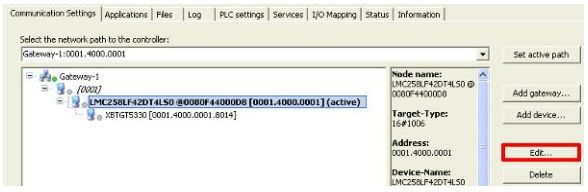
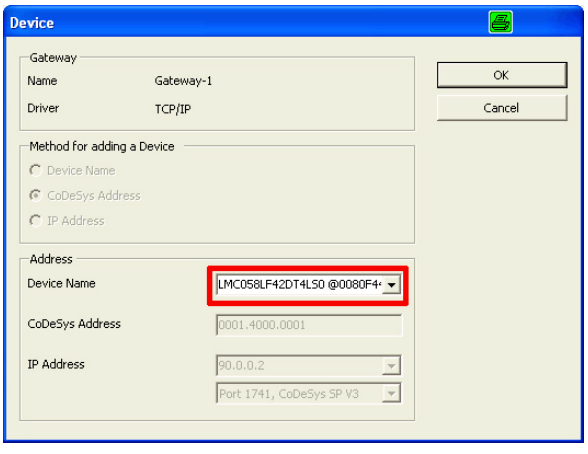
Setting up the HMI is done as follows:

- Main Window
- Communication settings
- Create a switch
- Create a numeric display
- Example screens

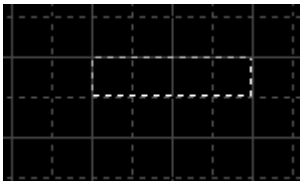
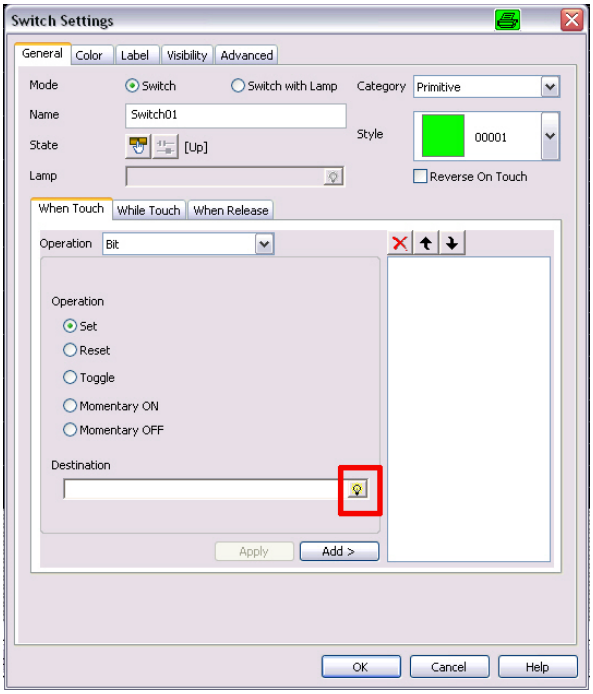
Main Window

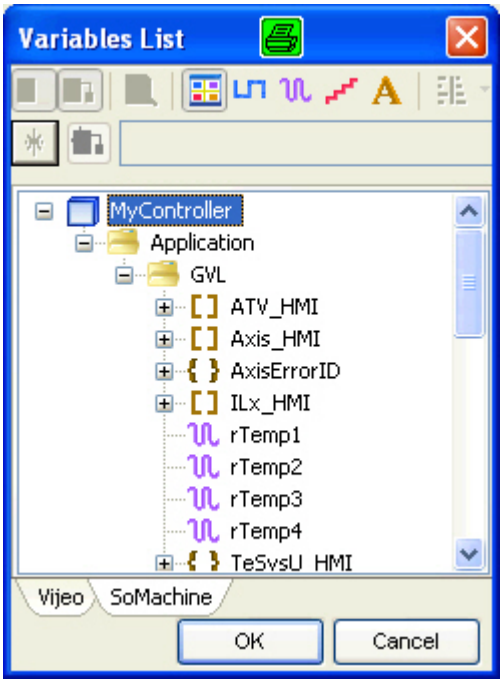
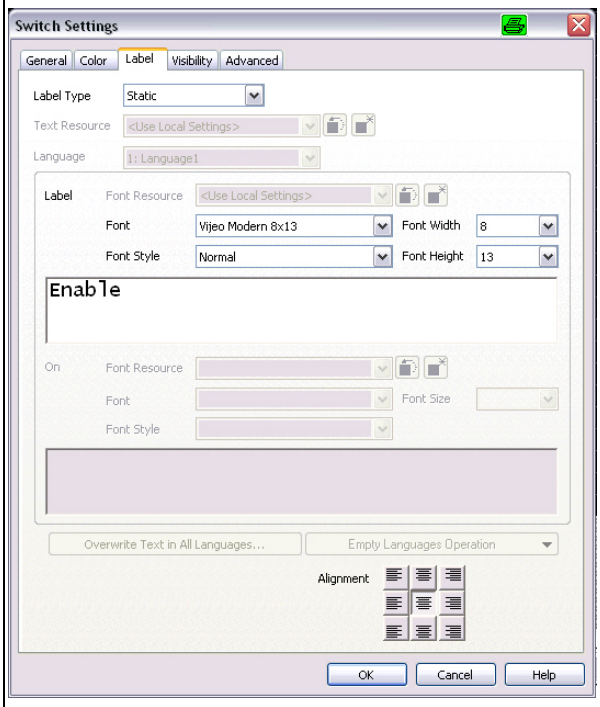
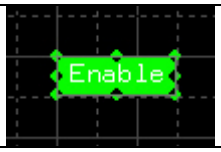
1	After double click on the **XBTGT5330** in SoMachine, Vijeo Designer opens the HMI main window.	 

Communi-cation settings

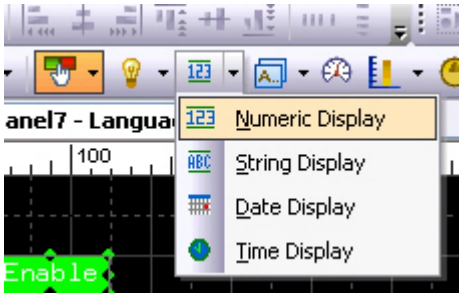
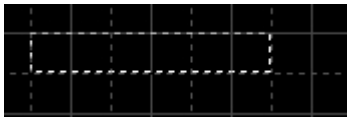
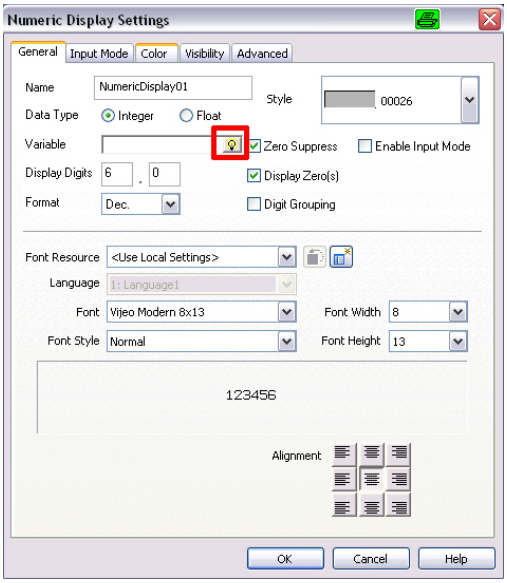
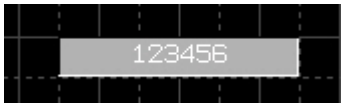
1	To set the communication parameters, in the **Navigator** select **IO Manager → SoMachineNetwork01 → SOM_MyController**	
2	In the dialog set the PLC **Equipment Address.** You will find this address in SoMachine…	
3	… by double clicking the **MyController.**	
4	In the **Communication** tab select the controller and click on **Edit.**	
5	The Equipment Address of the controller is displayed under **Device Name**.	

Create a switch

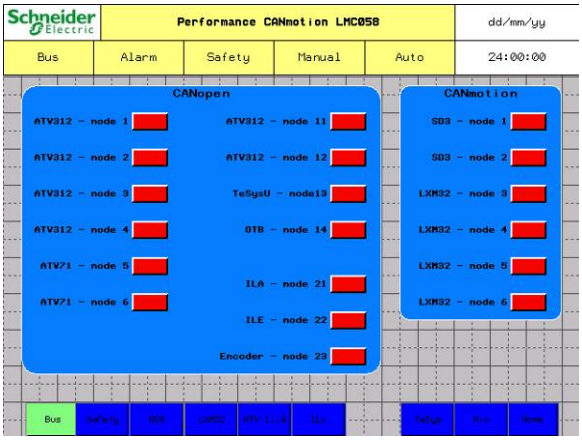
1	Select the **Switch** icon in the **Tool bar.**	
2	Select the position where you wish to place the button by opening a rectangle on the display and pressing Enter.	
3	In the **Switch Settings** dialog**,** select the variable that should be linked (use the bulb icon to do this) to the button.	

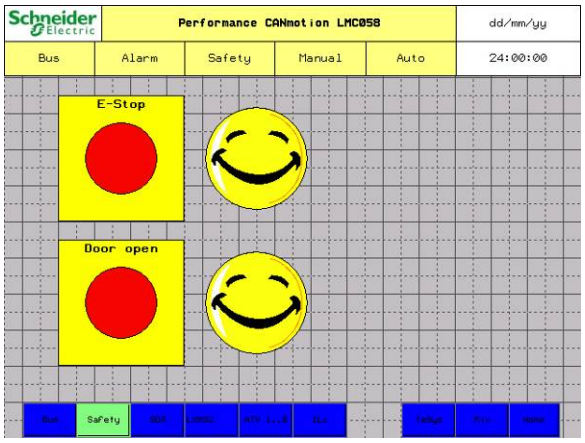
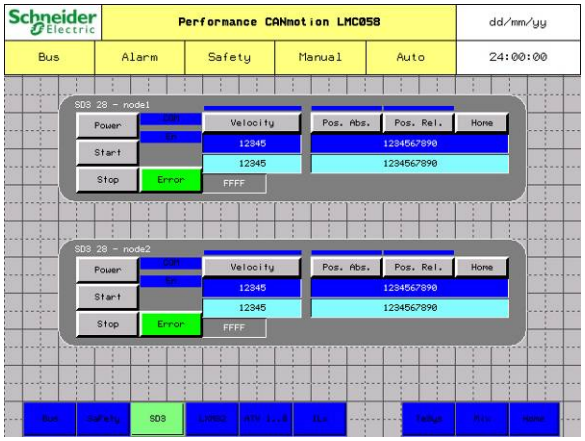
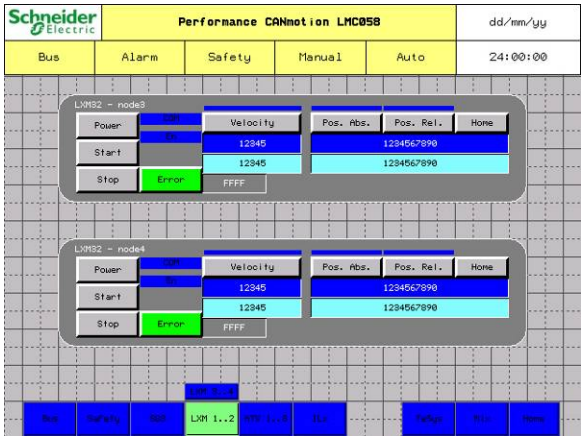
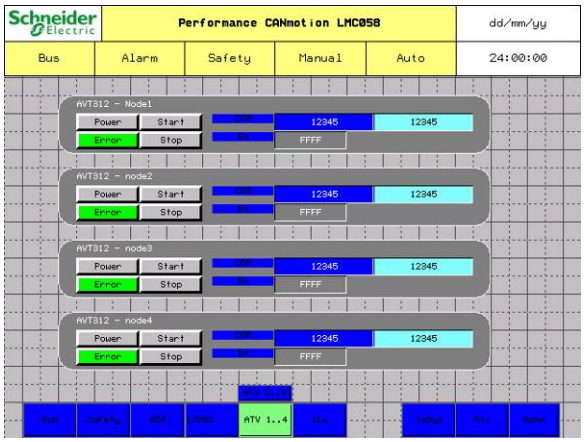
4	Click on the bulb icon (as indicated in the image above) to open the **Variables List** dialog. Go to the **SoMachine** tab, select the required variable and click **OK.**	
5	In the **Switch Settings** dialog go to the **Label** tab**.** Here select **Label Type: Static** and enter a name for the button, e.g. enable. Once you have entered your settings click on **OK**.	
6	The display now shows the new button.	

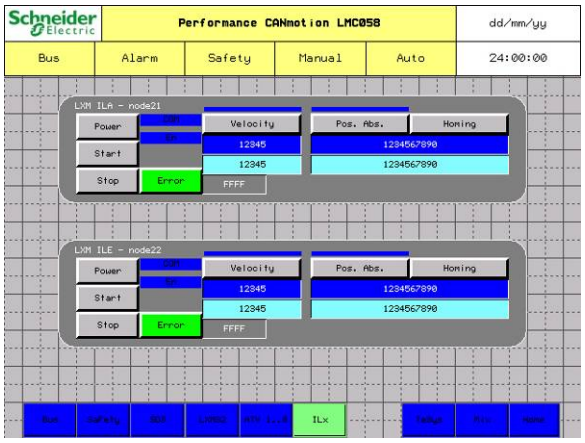
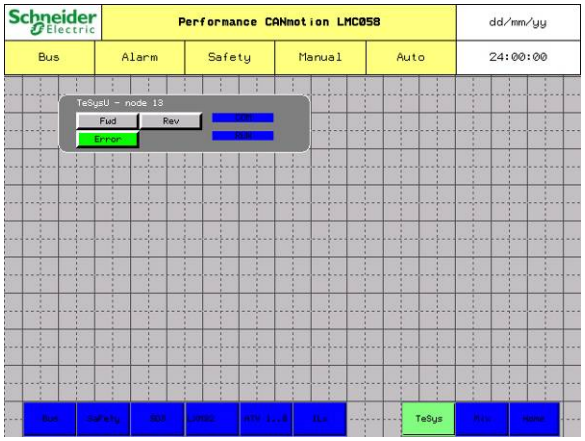
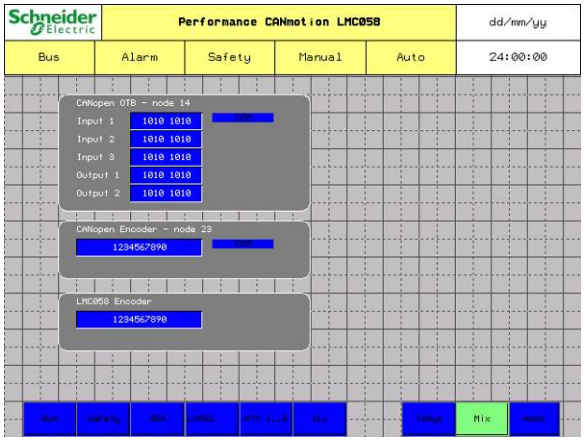
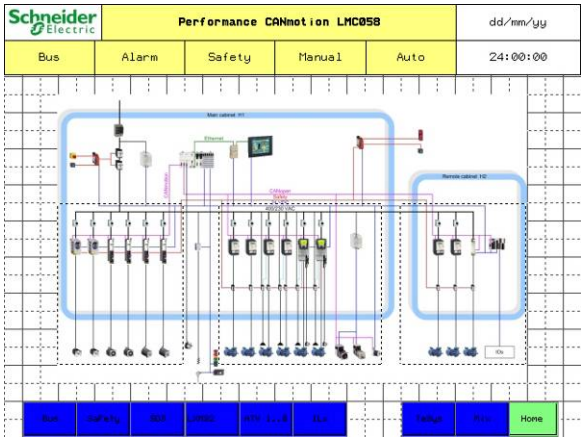
Create a Numeric Display

1	Click on the **Numeric Display** icon in the tool bar.	
2	Select the spot where you want to position the display by opening the rectangle and pressing Enter.	
3	In the **Numeric Display Settings** dialog go to the **General** tab. In **Display Digits** you can set the maximum number of the digits to be displayed for both integral and fractional part of the value. To link a **Variable** to the display click on the bulb icon to browse for a variable**.** Press **OK.**	
4	The display shows the new numeric display.	

Example screens

1	The **Bus** page shows the CANopen status for all devices.	

2	The “**Safety**” page shows the status of the emergency stop relay.	
3	Via the **SD3** page it is possible to control and observe the Lexium SD3 stepper drives.	
4	Via the two **LXM 1..2** and **LXM 3..4** pages it is possible to control and observe the four Lexium 32A drives. **LXM 1..2**: LXM32A node 3+4 **LXM 3..4**: LXM32A node 5+6	
5	Via the two **ATV 1..4** and **ATV 5..8** pages it is possible to control and observe the eight Altivar drives. **ATV 1..4**: ATV312 node 1..4 **ATV 5..8**: ATV71 node 5+6 ATV312 node 11+12	

6	On the **ILx** page it is possible to control and observe the two Lexium Integrated drives ILA and ILE.	
7	On the **TeSysU** page it is possible to control and observe the TeSysU motor starters.	
8	The **Mix** page shows the status of the input and output bits of the Advantys OTB island, the CANopen OsiSense (Osicoder) and the local encoder.	
9	The **Home** page of the HMI shows a picture of the main rack.	

Devices

Introduction

This chapter describes the steps required to initialize and configure the different devices required to attain the described system function.

General

Altivar 312, Altivar 71, Lexium SD3 and Lexium 32A drives are configured by using the local control panel.

The extended Advantys OTB IO island is configured by using the Advantys Configuration Software
The Advantys OTB CANopen addresses & baudrate are configured by using the onboard rotary switches.

Note

It is recommended that the controller is in stop mode before parameterizing the drives.

Altivar 312

Introduction

The ATV312 parameters can be entered or modified via the local control panel on the front of the device.

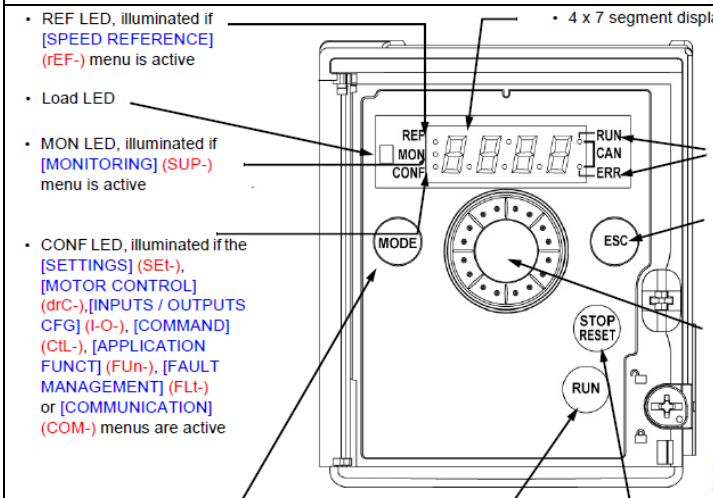
Note

If this is not a new drive it is recommended to return to the factory settings. If you need instructions on how to do this, please read the drive documentation.

Jog dial that is a part of the local control panel and can be used for navigation by turning it clockwise or counter-clockwise. Pressing the jog dial enables the user to make a selection or confirm information.

Control panel

1	The CANopen-Address and Baudrate can be input using the buttons and the jog dial on the control panel of the Altivar.



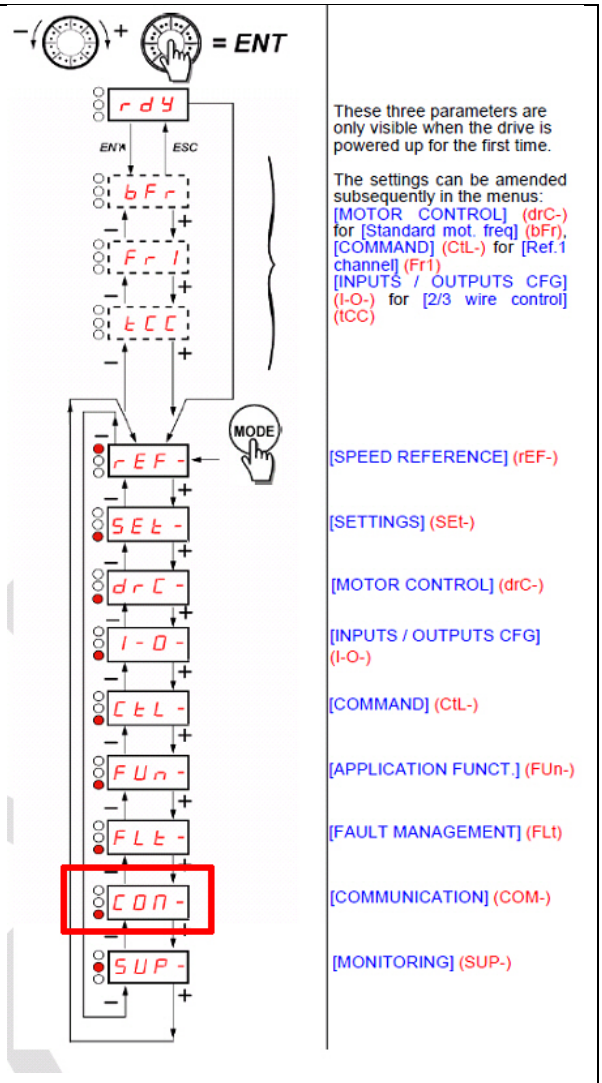
- REF LED, illuminated if [SPEED REFERENCE] (rEF-) menu is active
- Load LED
- MON LED, illuminated if [MONITORING] (SUP-) menu is active
- CONF LED, illuminated if the [SETTINGS] (SEt-), [MOTOR CONTROL] (drC-),[INPUTS / OUTPUTS CFG] (I-O-), [COMMAND] (CtL-), [APPLICATION FUNCT] (FUn-), [FAULT MANAGEMENT] (FLt-) or [COMMUNICATION] (COM-) menus are active
- MODE button (1): If [SPEED REFERENCE] (rEF-) is displayed, this will take you to the [SETTINGS] (SEt-) menu. If not, it will take you to the [SPEED REFERENCE] (rEF-) menu.
- 4 x 7 segment display
- 2 CANopen status LEDs
- Used to quit a menu or parameter or to clear the value displayed in order to revert to the value in the memory
- Jog dial - can be used for navigation by turning it clockwise or counter-clockwise - pressing the jog dial enables the user to make a selection or confirm information. = ENT

Functions as a potentiometer if [Ref.1 channel] (Fr1-) in the [COMMAND] (CtL-) menu is set to [Image input AIV1] (AIV1)

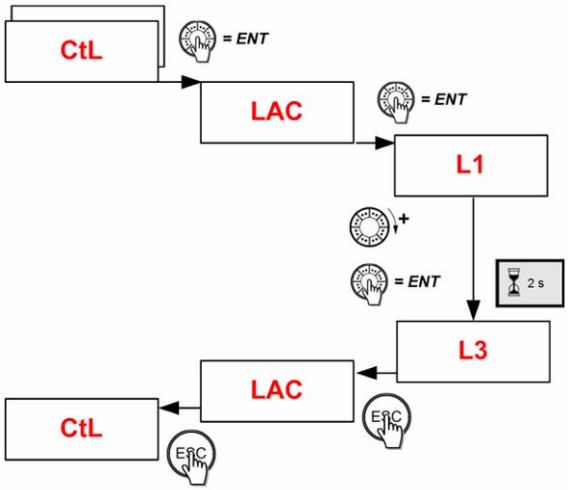
- RUN button: Controls powering up of the motor for forward running if the [2/3 wire control] (tCC) parameter in the [INPUTS / OUTPUTS CFG] (I-O-) menu is set to [Local] (LOC), page 45

STOP/RESET button
- Enables detected fault to be reset
- Can be used to control motor stopping
  - If [2/3 wire control] (tCC) is not set to [Local] (LOC), freewheel stop
  - If [2/3 wire control] (tCC) is set to [Local] (LOC), stop on ramp or freewheel stop during DC injection braking

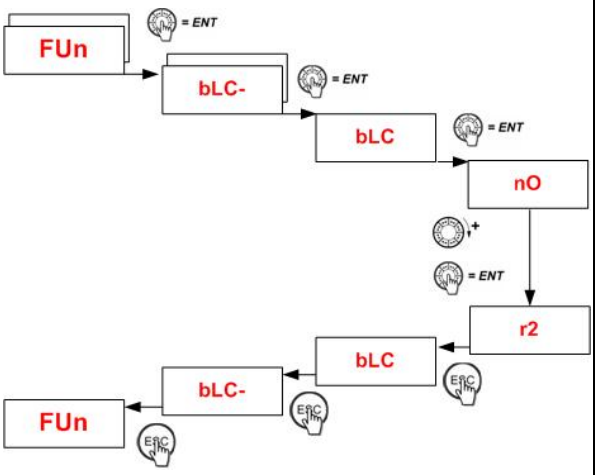
CANopen settings

1	Using the buttons on the front panel, select the sub-menu **Communication**.	
2	In the **Communication (COM)** sub-menu input the CANopen address in the parameter **AdC0.** In the example application the addresses for the six drives are **1** to **4**, **11** & **12.**	
3	Also in the **Communication (COM)** sub-menu, in the parameter **BdC0,** set the Baudrate to **500.0** (kBits).	
4	For the ATV312 to operate with the new address or Baudrate, a power cycle (on, off, on) is required.	

Changing the Access Level LAC

1	To set the parameters for the brake function a higher access level (L3) is required.	
2	To go to expert mode L3: ➔ Select **CtL** [COMMAND] and press enter ➔ Select **LAC** [ACCESS LEVEL] and press enter ➔ **L1** (Level 1) is displayed ➔ Select **L3** (Level 3) and press enter for 2 seconds to set the new level. Return to the **LAC** with **ESC.** Return to the **CtL** with **ESC.**	

Brake settings

1	The r2 relay output is used for brake control.	
2	To assign the r2 relay output : ➔ Select **FUn-** [APPLICATION FUNCT.] and press enter ➔ Select **bLC-** [BRAKE LOGIC CONTROL] and press enter ➔ Select **bLC** [BRAKE ASSIGNMENT] and press enter ➔ Select **r2** and press enter. Set the parameters to the values shown here on the right. **Note:** These parameters are for the test machine only. They are **NOT VALID** for every machine. After all parameters are set return to the **bLC** with **ESC.** Return to the **bLC-** with **ESC.** Return to the **FUn** with **ESC.**	 **Brake Logic parameters** **Parameter** / **Value** bLC [Brake assignment] — R2 brL [Brake release freq] — 0 Hz Ibr [Brake release I FW] — 0 A brt [Brake release time] — 0 s LSP [Low speed] — 0 Hz bEn [Brake engage freq] — 0 Hz bEt [Brake engage time] — 0.5 s bIP [Brake impulse] — No

Altivar 71

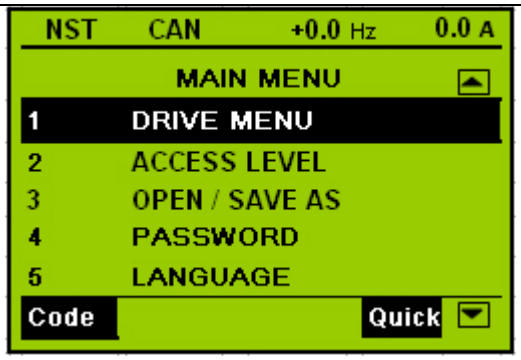
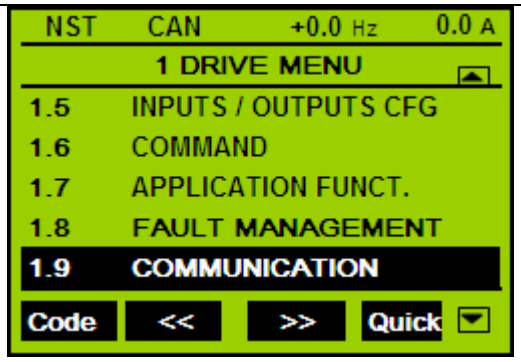
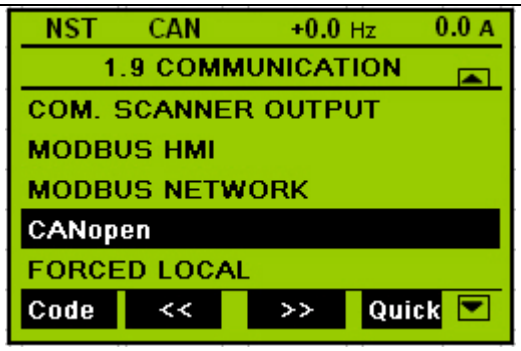
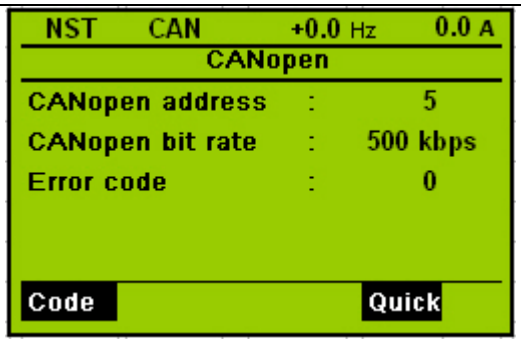
Introduction

The ATV71 parameters can be entered or modified using the graphic keypad panel.

Note

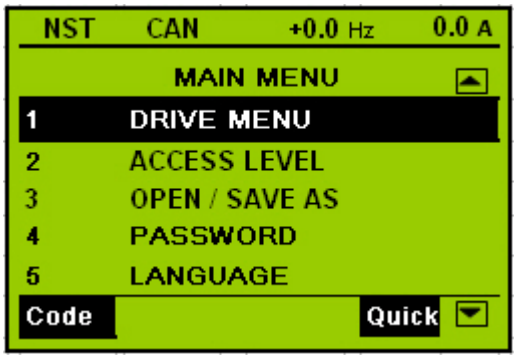
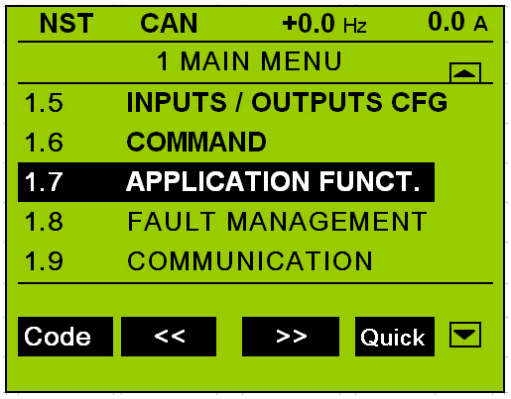
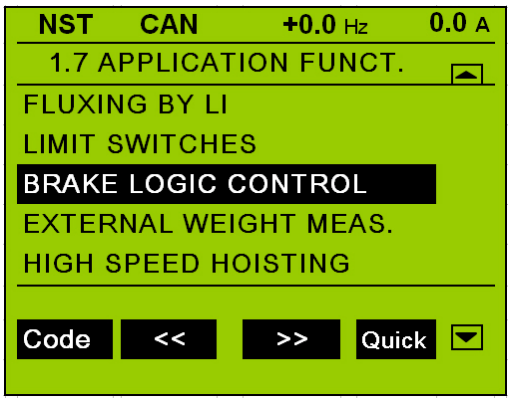
If this is not a new drive it is recommended to return to the factory settings. If you need instructions on how to do this, please refer to the drive documentation.

CANopen settings

1	The CANopen address and Baudrate can be input using the jog dial on the front panel of the Altivar.	
2	To set the **CANopen address** and the **Baudrate** go to 1 DRIVE MENU and press Enter.	
3	Go to **1.9 COMMUNICATION** and press Enter**.**	
4	Go to **CANopen** and press Enter**.**	
5	Set the **CANopen address** to **5** for the first one. For the other drives it is **6**. Set the **CANopen bit rate** to **500 kbps.**	

6	After changing the configuration it is necessary to power cycle the drive. **Note:** For high power drives (more than 90 kW) it is recommended to do an automatic reboot with the graphic keypad panel (refer to drive user's manual for details)	

Brake settings

1	To change the brake settings go to: **1 DRIVE MENU** and press Enter**.**	
2	Go to **1.7 APPLICATION FUNCT.** and press Enter.	
3	Go to **BRAKE LOGIC CONTROL** and press Enter.	

4	Set the parameters to the values shown here on the right. **Note:** These parameters are for the test machine only. They are **NOT VALID** for every machine.	

Parameter name	Value
Brake assignment	R2
Movement type	Hoisting
Brake contact	No
Brake impulse	No
Brake release I FW	0 A
Brake release time	0 s
Brake release freq.	0 Hz
Brake engage freq	0 Hz

Lexium 32A

Introduction

The LXM32A parameters can be entered or modified using the local control panel on the front of the device.

Note

If this is not a new drive it is recommended to return to the factory settings. If you need instructions on how to do this, please refer to the drive documentation.

CANopen settings

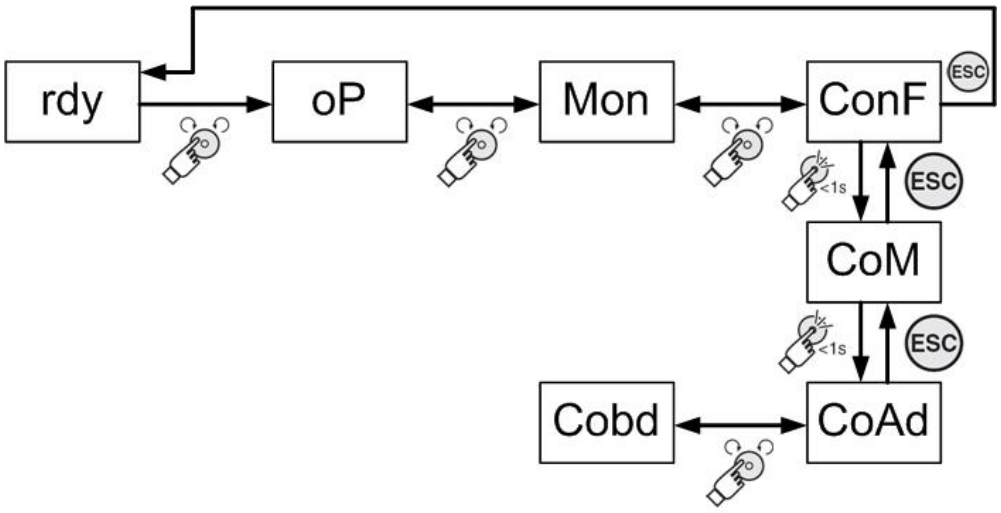
1

If the drive is being started for the first time, the **FSu** (First Setup) is invoked. Only the CANopen address (**CoAd**) and the baudrate (**Cobd**) are initially needed.

If the drive has never been started before, follow the steps below to change the address or the baudrate.

In this project the **CANmotion addresses** for the drives are **3…6**.

The **Baudrate** for the drives is **1000 kBaud**.



Parameter name HMI menu HMI name	Description
CANaddress ConF → CoN- ConF → FSu- CoAd	CANopen address (node number) Changed settings become active the next time the product is switched on.
CANbaud ConF → CoN- ConF → FSu- Cobd	CANopen baud rate **50 / 50 kBaud / 50**: 50 kBaud **125 / 125 kBaud / 125**: 125 kBaud **250 / 250 kBaud / 250**: 250 kBaud **500 / 500 kBaud / 500**: 500 kBaud **1000 / 1 MBaud / 1000**: 1 MBaud Changed settings become active the next time the product is switched on.

Lexium SD3

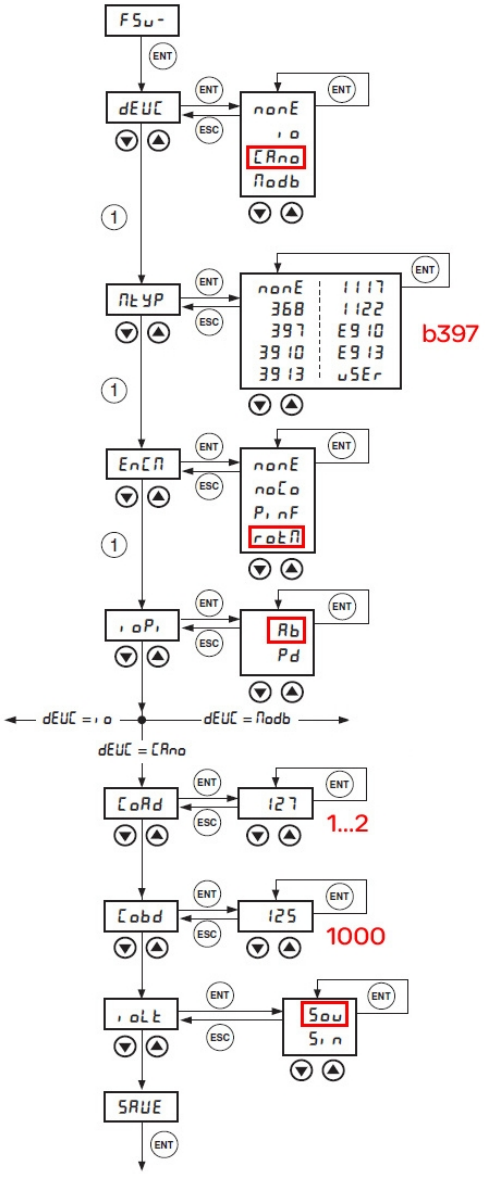
Introduction

The SD328 parameters can be entered or modified via the local control panel on the front of the device. Before you could start the drive configuration with SoMachine it is mandatory to set a CANopen address and a Baudrate.

Note

If this is not a new drive it is recommended to return to the factory settings. If you need instructions on how to do this, please read the drive documentation.

CANopen settings

1	If the drive is started for the first time, the **FSu** (First Setup) starts. Then CANopen (**CAno**) must be set and the CANopen address (**CoAd**) and the baudrate (**Cobd**). If the drive is not started for the first time, follow the steps underneath to change the address or the baudrate. In this project the **CANopen address** for the drives are **1 + 2**. The **Baudrate** for the drives is **1000 kBaud**.
2	

TeSysU

Introduction

This chapter concerns the TeSysU motor starter components used in this system. They can be adapted according to the application (motor output, reversing or non-reversing).

Basically, the TeSysU motor control unit comprises of:

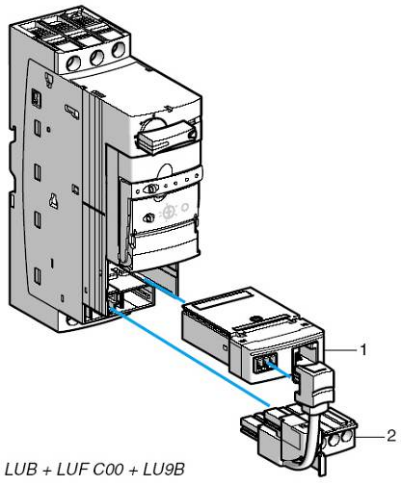
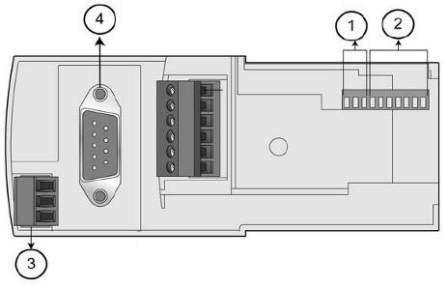
- Power base
- Control unit
- Communication module
- Coil wiring kit
- Optional: reversing block, I_s limiter/isolation block and other modules

The following points should be taken into account when selecting components:

A 24 Vdc LU2B xx BL control unit must be used. Verify that it has the BL extension.

There are different versions of the coil wiring kit, which depends on the power base. LU9BN11C should be used if the power base has one direction of rotation (LU2Bxx) and LU9MRL should be used if the power base has two directions of rotation (LU2Bxx).

TeSysU

1	**TeSysU** **Power base** LU2B12BL **Control unit** LUCA05BL **Communication module for CANopen** LULC08 (1) **Coil wiring kit** LU9MRL (2)	 *LUB + LUF C00 + LU9B*
2	**TeSysU CANopen communication module** **LULC08** The communication module is connected to the CANopen bus using cable. **TSXCANCADD1**	 **1** Baud rate **2** Address **3** Power base connector **4** CAN bus connector

3

TeSysU CANopen communication module

LULC08

The baud rate is set to **500 kbps.**

SW10	SW9	SW8	Baud Rate
0	0	0	10 kbps
0	0	1	20 kbps
0	1	0	50 kbps
0	1	1	125 kbps
1	0	0	250 kbps (default)
1	0	1	500 kbps
1	1	0	800 kbps
1	1	1	1,000 kbps

4

The following address is used:
Bus address 13:

SW7	SW6	SW5	SW4	SW3	SW2	SW1	Address
0	0	0	0	0	0	0	Not valid
0	0	0	0	0	0	1	1 (default)
0	0	0	0	0	1	0	2
0	0	0	0	0	1	1	3
0	0	0	0	1	0	0	4
0	0	0	0	1	0	1	5
0	**0**	**0**	**1**	**1**	**0**	**1**	**13**

5

NOTE:

TeSysU needs 24 Vdc on CANopen cable to operate. See the chapter:

Communication: CANopen TAP: TSXCANTDM4 wiring.

Advantys OTB

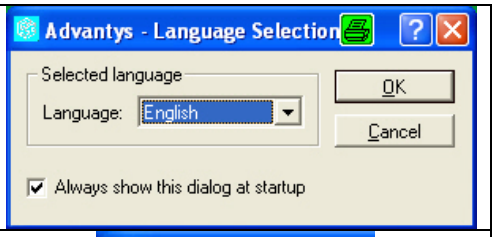
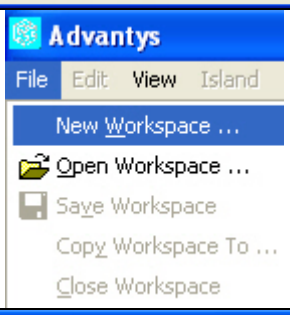
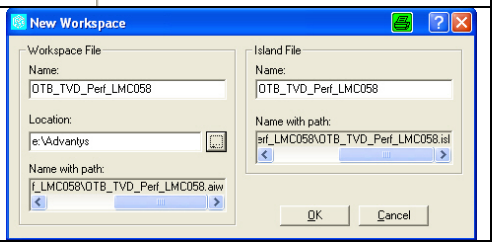
General

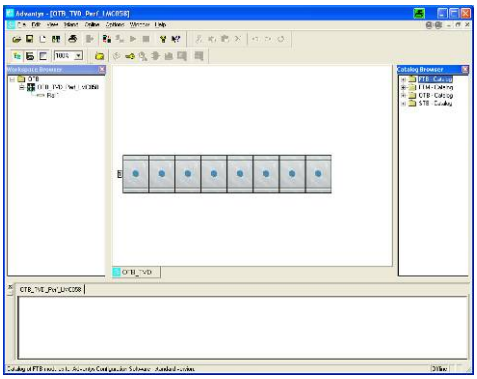
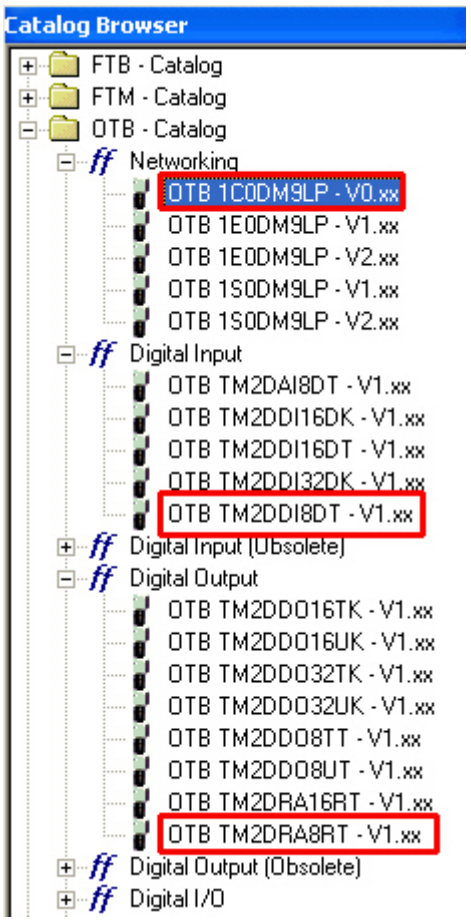
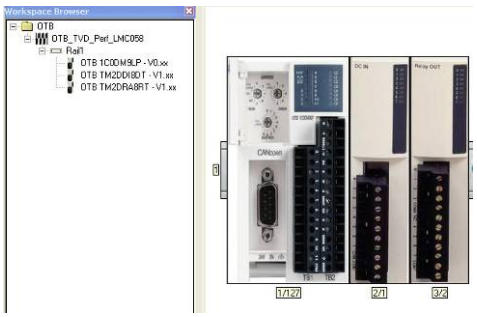
The extended OTB EDS (electronic data sheet) file is generated by using the Advantys Configuration Software. This section describes how to generate an EDS file, that can be imported into SoMachine Device Repository (see chapter Controller).

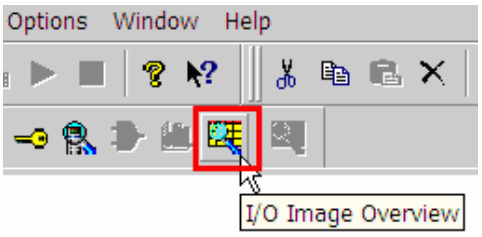
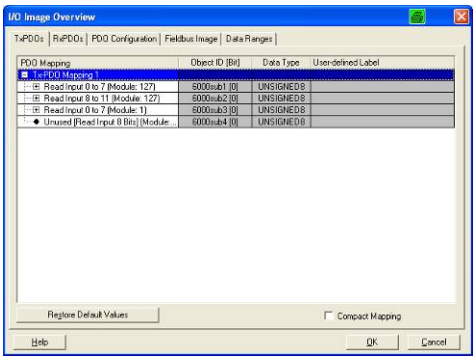
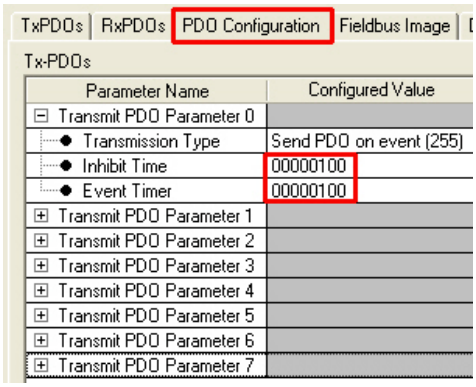
Note

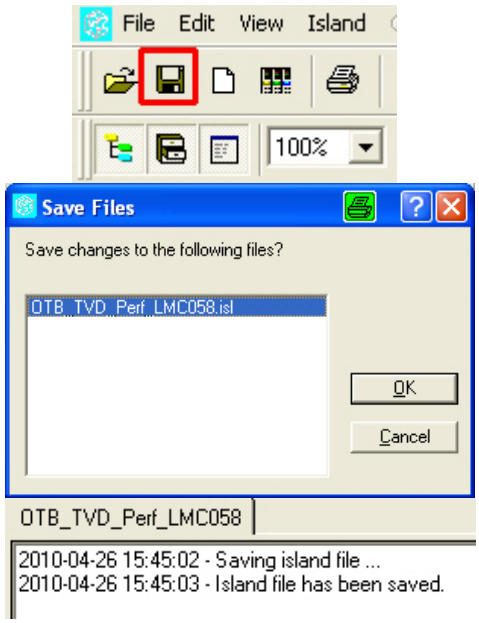
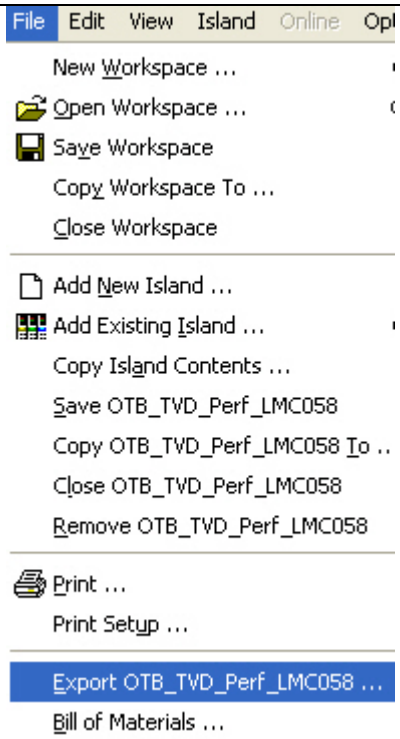
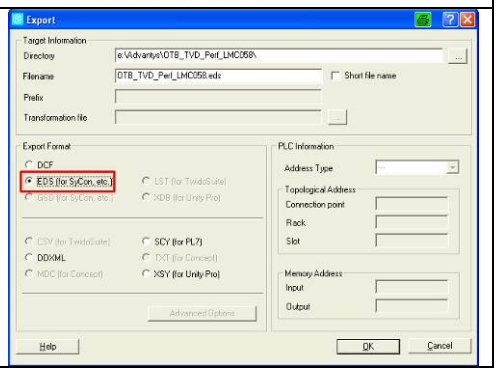
If the user is using only the basic OTB module; the OTB1CODM9LP device can be used that is already installed in SoMachine Device Repository.

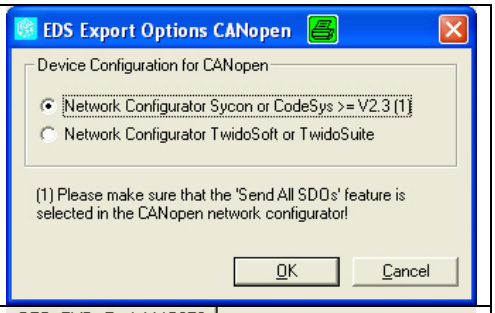
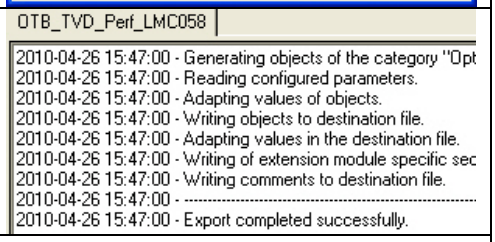
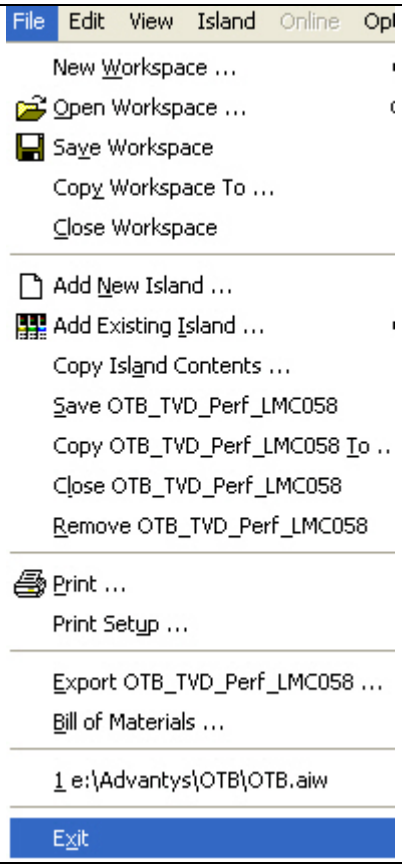
Advantys OTB Configuration

1	On start-up of Advantys Software select your **Language** and click on **OK**.	
2	Select: **File** -> **New Workspace**…	
3	Type in the **Workspace File Name** and the **Island File Name**. Click on **OK**.	

4	The **Advantys** window opens with empty configuration workspace. On the right side of the workspace is the **Catalog browser.** Select the appropriate modules. **1x OTB1CODM9LP** **1x TM2DDI8DT** **1x TM2DRA8RT**	 
5	The image on the right shows the configured rack.	

6	Click on the **I/O Image Overview** icon	
7	The **I/O Image Overview** opens in the tab TxPDO's. The digital Inputs are located to the **TxPDO Mapping 1**	
8	Select the **PDO Configuration** tab Open the Transmit PDO Parameter 1 for the 1st module. There the factory settings can be changed. Inhibit Time: **100** Event Timer: **100**. Close the window with **OK** **Note:** With the **Inhibit Time**=0 and **Event Timer**=0 the analog values are not transmitted via the CANopen.	

9	To store the configuration press **Save Workspace** and **OK**	
10	To generate the EDS File select **File** -> **Export OTB_TVD_Perf_LMC058**	
11	Enter the **Filename** and select **EDS** as **Export Format**. Continue the export with **OK.**	

12	Select **Network Configuration SyCon or CoDeSys** and click **OK.**	
13	The successful export is initiated at the bottom of the main window.	
14	**NOTE:** Refer to Communication chapter how to set OTB CANopen Baudrate and Bus address.	
15	To exit the Advasntys Configuration Tool **File -> Exit**	

Appendix

The Packaging Application

Introduction

Different machines and processes share the same initial requirements that can be implemented with a generic architecture employing the current Schneider Electric product offer. These generic architectures include power supply, controller, motion, visual indication, communication and functional machine safety aspects. The use of these generic architectures to implement customer solutions covers not only cover a large section of customer automation requirements but allows the implementation of a tested and validated software and hardware solution.

This chapter describes the Schneider Electric application function blocks, running on the architecture described here. This document does not provide a functional description for application solutions. The functions listed here are not comprehensive and form only a foundation for real life applications. It is not intended to provide an application that fulfills a real life situation in all aspects.

The information given here is intended to give the user a brief overview of the function blocks, which are running on the described architecture. For additional information concerning the Packaging Application Function Blocks please refer to the SoMachine help.

It is expected that the reader has at least a basic knowledge of the industrial application for which these function blocks are provided and understands the professional jargon normally used in that type of application. This document is not an introduction into the specific type of industrial application for which this solution is provided.

Note :
The packaging application function blocks can only be used with S-type controllers.
If you use G-type controllers, the message *"Use of <Name of FB> is not authorized with the current type of device*" appears during the build phase.

Application Basics

Usually packaging applications consist of the following three machine types:

- Primary machines

  These machines work in direct contact with the products to be packaged:

  - Horizontal bagging machines
  - Vertical bagging machines
  - Flexible package form, fill & seal machines
  - Rigid package fill and close machines
  - Blister fill and seal machines
  - Filling and closing machines

- Secondary machines

  Secondary machines are linked to products that are required to pack the primary product and any accessories that must be combined in the package:

  - Boxing and carton machines
  - Wrapping machines (sleeve, wrap-around, shrink)
  - Palletizing / de-palletizing machines
  - Pallet securing (stripping, shrink wrapping, stretch ...)

- Others

  Machines not linked to packaging functions but are part of the packaging process:

  - Labeling
  - Marking
  - Decorating
  - Cleaning machines
  - Feeding machines and systems
  - Rinsing & washing machines
  - Cooling machines
  - Drying machines
  - Testing & inspection machines

Application Specifics

Application Dedicated Hardware

General description of the hardware

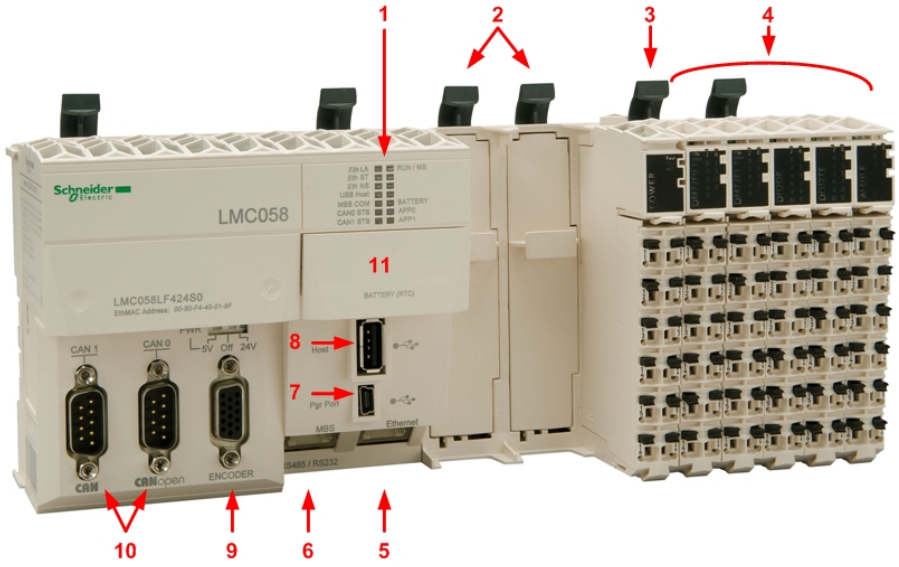
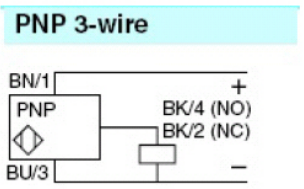
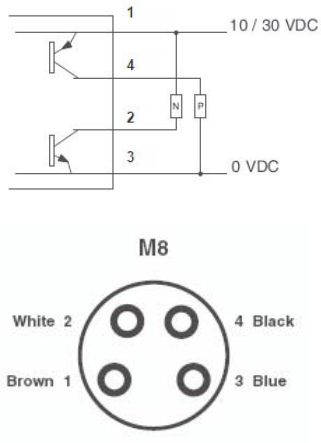
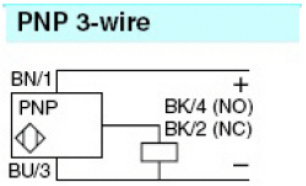
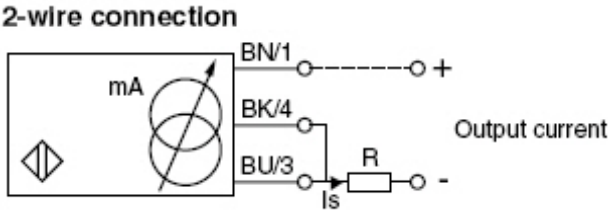
Motion Controller **LMC058 S-Type** LMC058LF424**S0**	1. Status LEDs 2. IF slots 3. Power supply 4. Internal I/O area 5. Ethernet port 6. RS485 port 7. Mini USB port 8. USB A port 9. Encoder connector 10. CANopen and CANmotion ports 11. Battery area
	
Inductive proximity sensor **OsiSense (Osiprox)** **XS612B1PAL2** Pre-cabled (L = 2 m) for Digital Tension Control	
	

Photo-electric sensor **OsiSense (Neptune)** **XUYFANEP40015** for Lateral Position Control with cable **XZCP0941L5**		
Inductive proximity sensor **OsiSense (Osiprox)** **XS508B1PBM8** for Pick and Place with cable **XZCP0166L5**		
Inductive proximity sensor **OsiSense (Osiprox)** **XS4P12AB120** **4…20 mA** Pre-cabled (L = 2 m) for Analog Tension Control		
Sensor for Temperature Measurement **Pt100** **PT46X150 Labfacility (Third Party)**		

Application Function Blocks

To facilitate the software engineering tasks associated with the application described, Schneider Electric has developed an Application Function Block Library that has been tested and validated.

The following pages list the application function blocks that are implemented in the architecture described here.

The **Packaging** and the **Toolbox** libraries need to be included in the application program (See the chapter *Controller: Include new library file*)

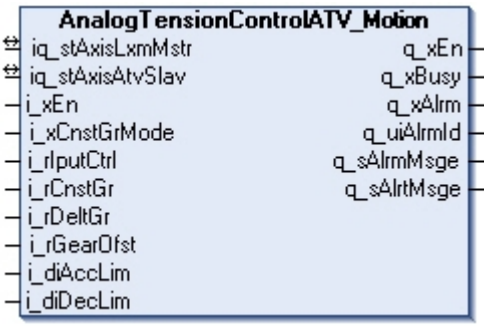
For additional information concerning the packaging AFB's please refer to the SoMachine help.

List of packaging functions which are running on the Performance CANmotion LMC058 architecture:

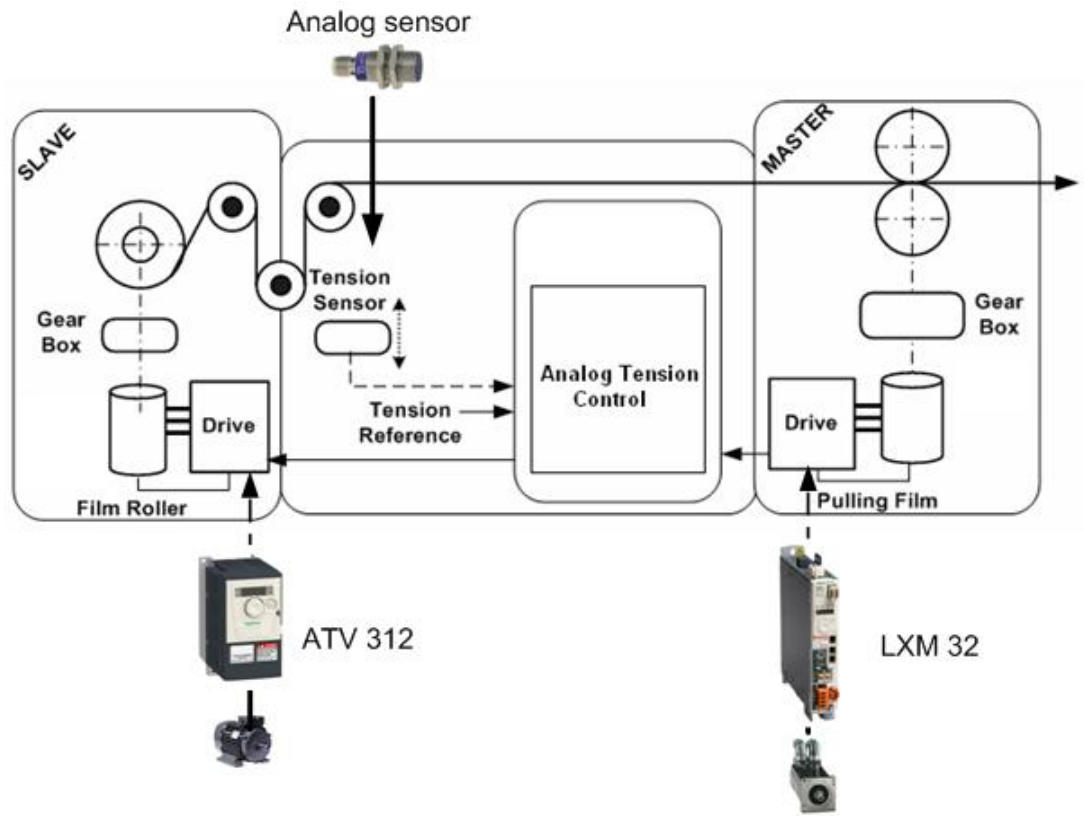
- AnalogTensionControlATV_Motion
- AnalogTensionControlLXM_Motion
- DigitalTensionControlATV_Motion
- TemperatureControl
- LateralPositionControl
- RotaryKnife_Motion
- FlyingShear_Motion
- GroupingAccumulator_Motion
- GroupingStripper_Motion
- Clamping_Motion

AnalogTensionControlATV_Motion

The goal of this Application Function Block is to maintain the tension of the film. This is achieved by controlling the position of the arm dancer. This Application Function Block is the link between a CANopen slave axis (ATV) and a CANmotion master axis (LXM) via an analog sensor.

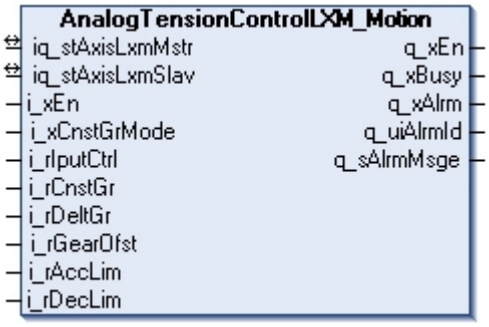


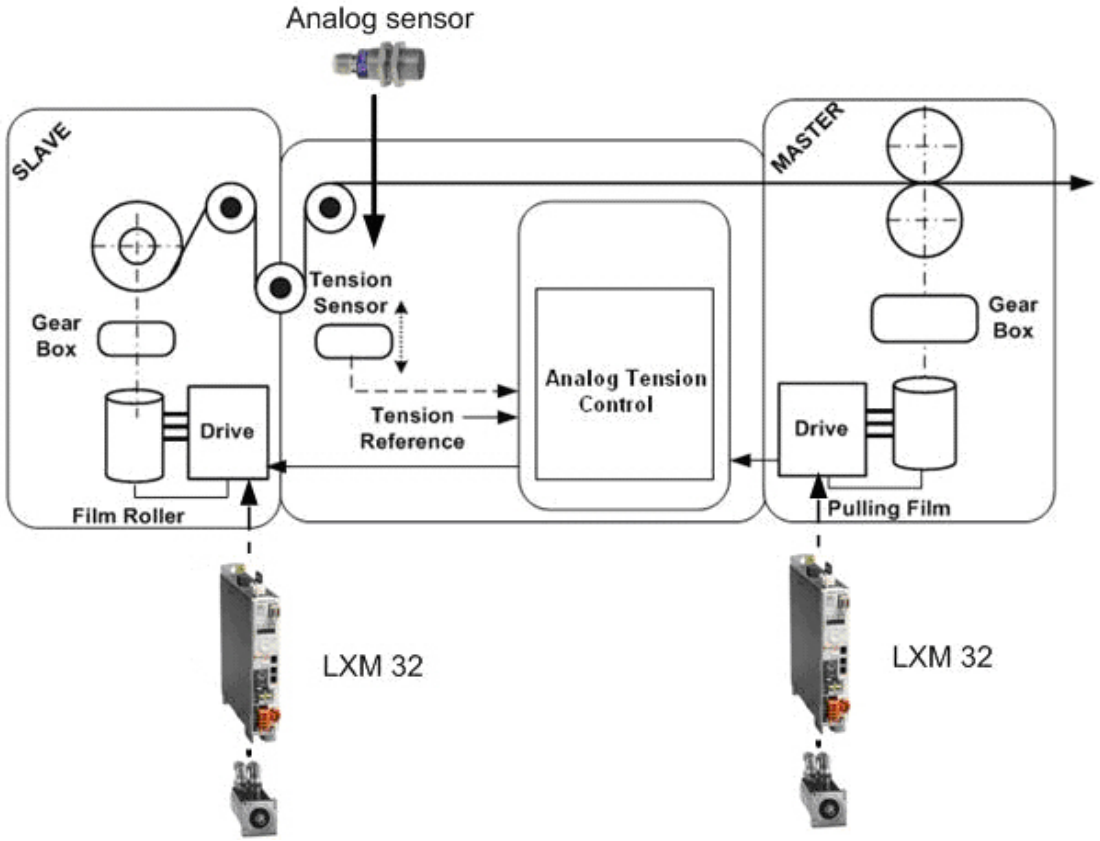
AnalogTensionControl setup



AnalogTensionControlLXM_Motion

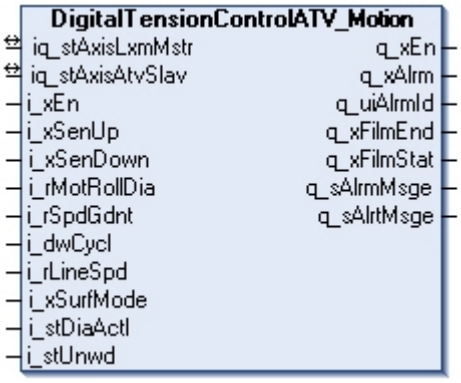
The goal of this Application Function Block is to maintain the tension of the film. This is achieved by controlling the position of the arm dancer. This Application Function Block is the link between a CANmotion slave axis (LXM) and a CANmotion master axis (LXM) via an analog sensor.



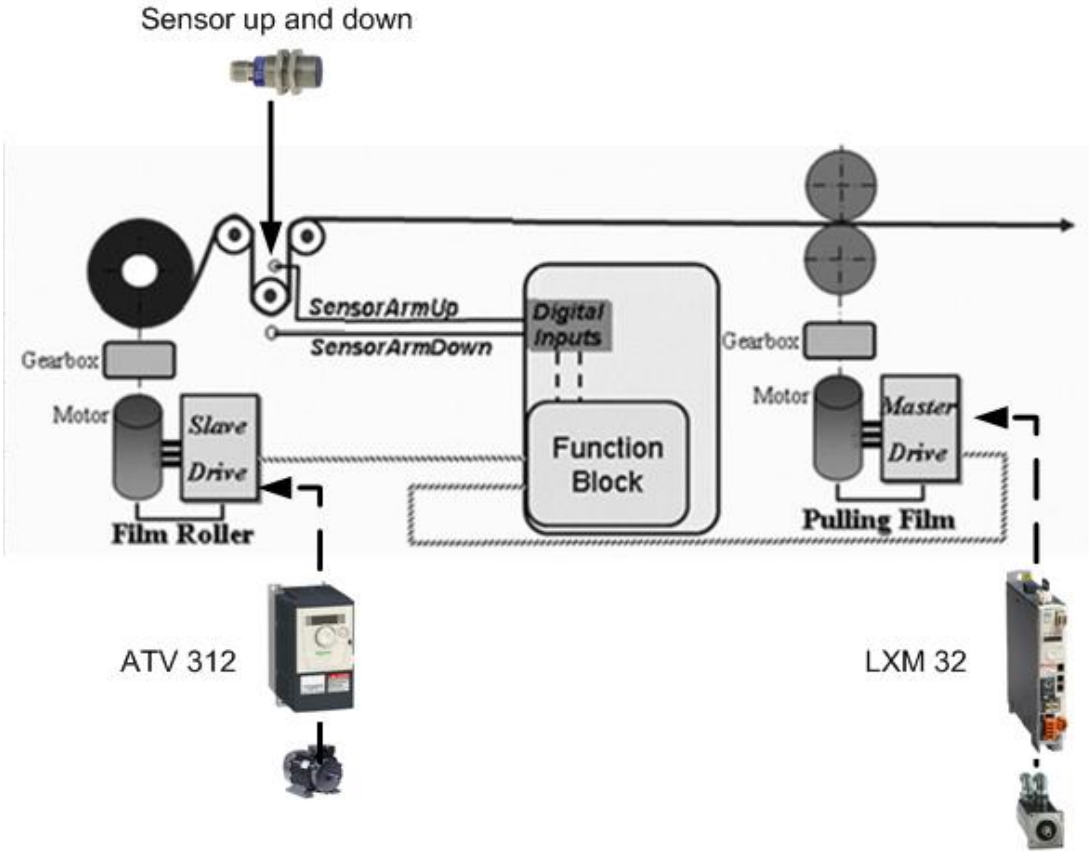


DigitalTensionControlATV_Motion

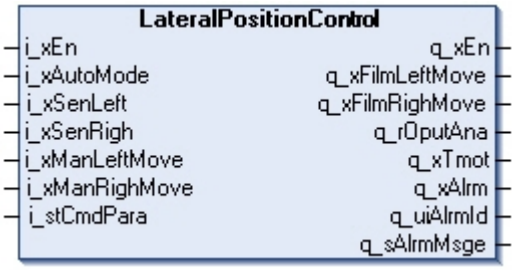
The goal of this Application Function Block is to maintain the tension of the film between two limits. This is achieved by controlling the position of the arm dancer. This Application Function Block provides the coupling between a CANopen slave axis (ATV) and a CANmotion master axis (LXM) via a digital sensor.



DigitalTensionControl setup



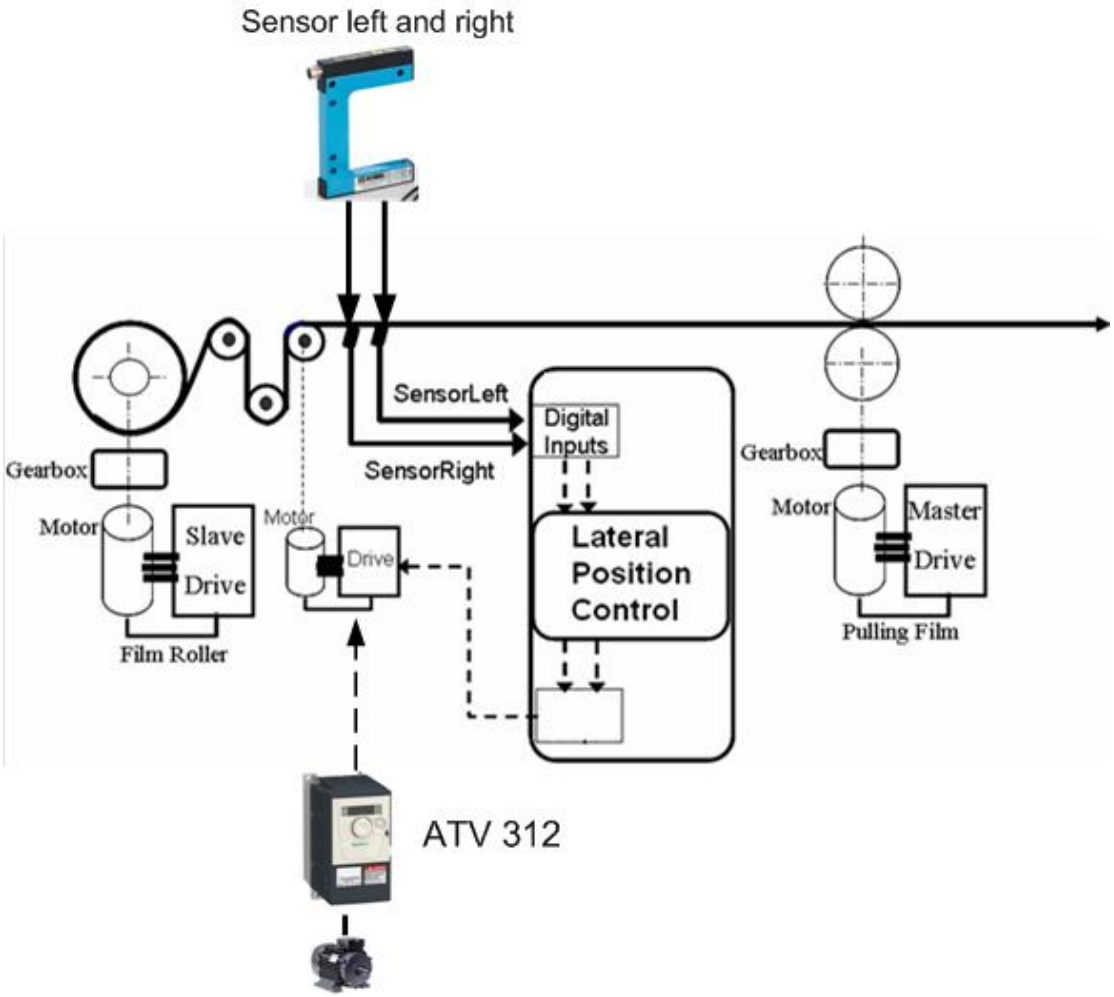
LateralPositionControl



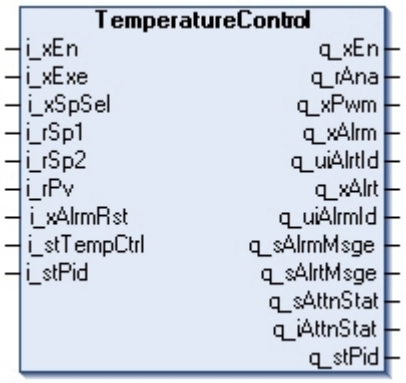
This block controls and corrects the lateral positioning of a film while it is unwinding from a reel.
This function helps the “cutting device” to cut film at the correct position.
The correction is based on fixing the edges of the film between two digital sensors. If the lateral film position is in good (e.g. between SensorLeft and SensorRight), the path is not corrected. If, however, depending on sensor configuration, the film position is incorrect, it must be corrected. One can select between digital or analog output mode.

In this architecture digital output is used.

LateralPositionControl setup



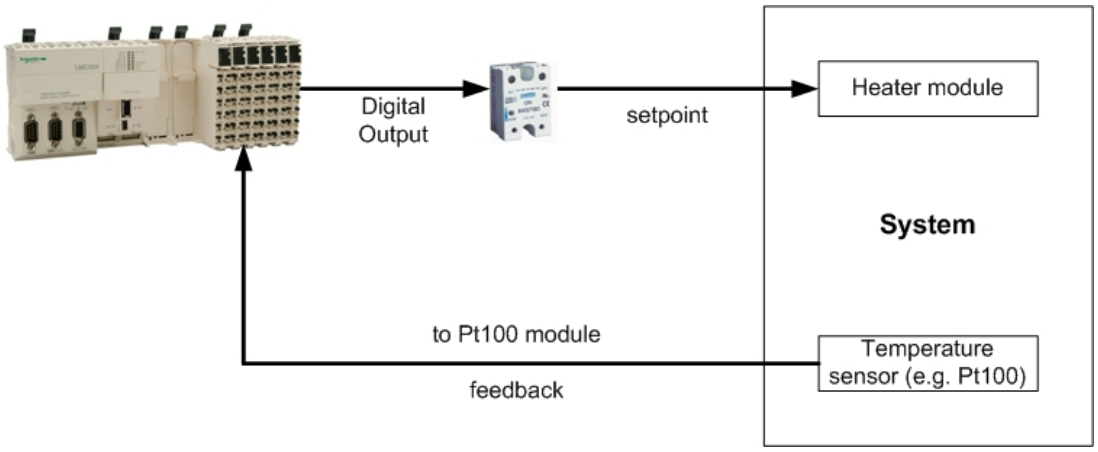
TemperatureControl



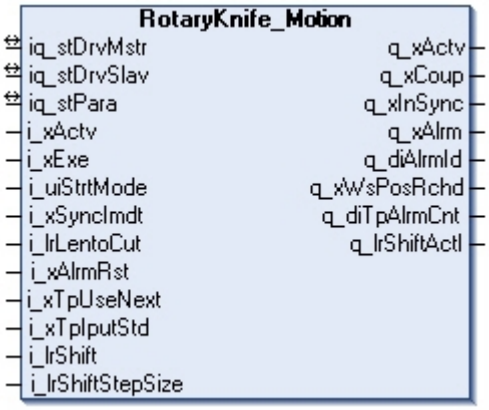
The function block TemperatureControl is designed for monitoring and controlling a wide variety of temperature-dependent processes.
Main characteristics

- Auto-Tuning or Self-Tuning based on inflectional tangential method
- Pulse width modulation output for controlling switching actuators
- Standby function
- Filtering functions for analogue sensor input
- Set point ramping function
- Tolerance band monitoring (two different tolerance bands)
- Absolute value monitoring
- Commissioning screens

TemperatureControl setup



RotaryKnife_Motion



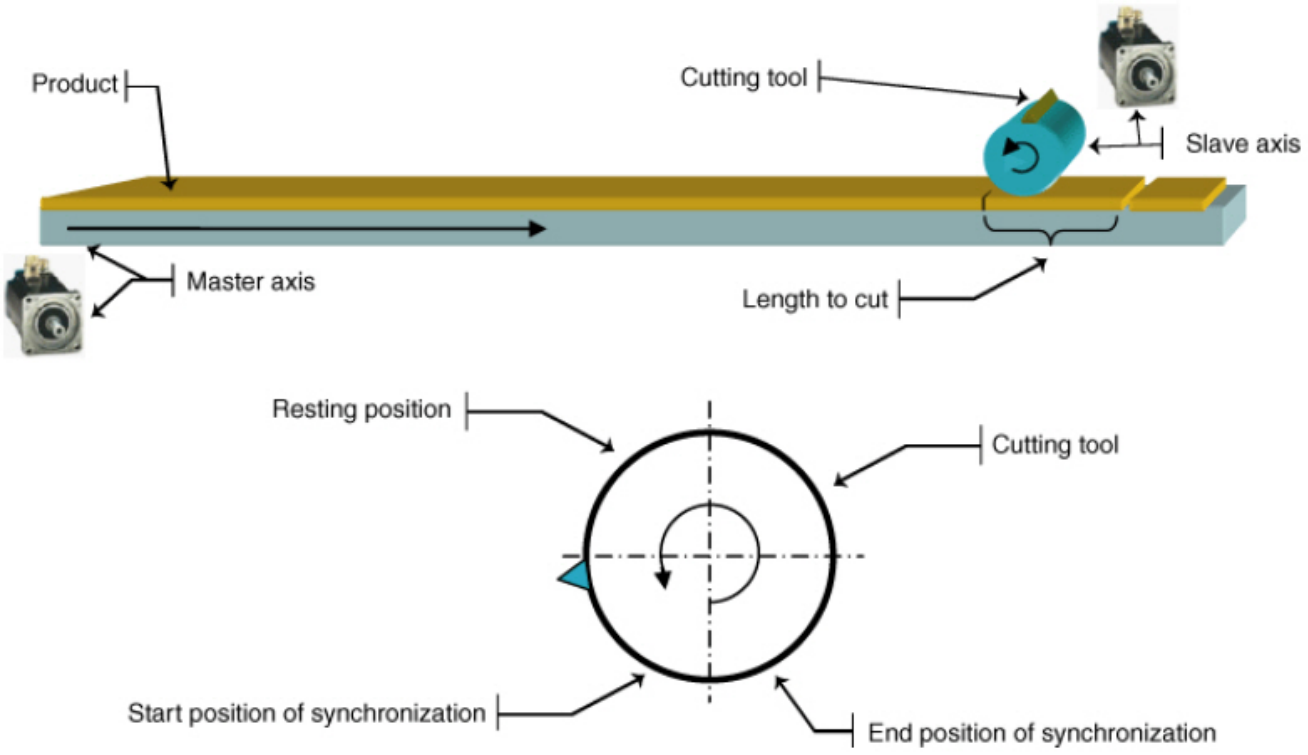
The RotaryKnife_Motion function block controls a machine that performs an operation, on the fly, on a moving part.
Typical operations can include:

- Cutting
- Sealing
- Marking

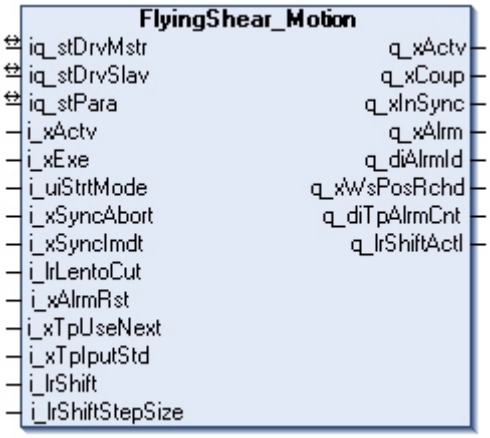
The RotaryKnife_Motion function is required for moving the operational axis to synchronize it with the forward motion of the part.
This introduces the concept of master and slave axis.

- Master: moves the part forward
- Slave: performs the operation

The figure below gives an example of a Rotary Knife application. Master axis is a linear axis type whereas the axis slave is a rotary axis.



FlyingShear_Motion



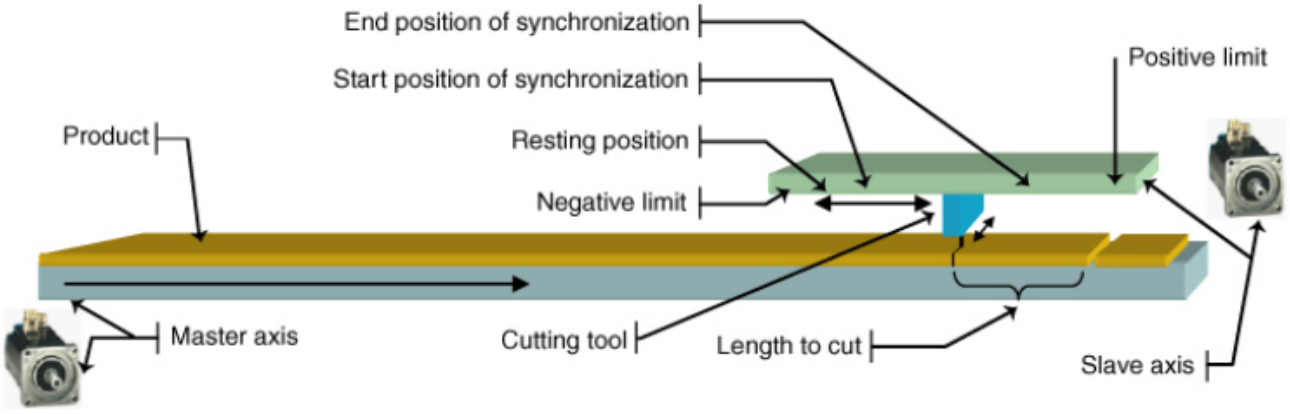
The FlyingShear_Motion function block controls a machine that performs an operation, on the fly, on a moving part.
Typical operations can include:

- Cutting
- Clamping
- Stamping
- Marking

The Flying Shear function is required for moving the operational axis to synchronize it with the forward motion of the part.
This introduces the concept of master and slave axis.

- Master: moves the part forward
- Slave: performs the operation

The figure below gives an example of a Flying Shear application. Both master and slave axis are linear axis types.



Grouping/Ungrouping FBs

Those function blocks are:

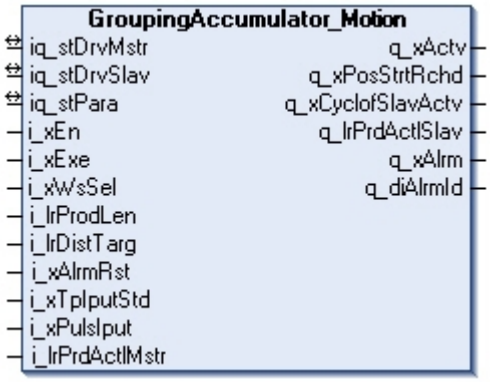
- **GroupingAccumulator_Motion**
- **GroupingStripper_Motion**

Grouping/Ungrouping involves the synchronization of several conveyors to sort and organize products in a predefined way (groups).

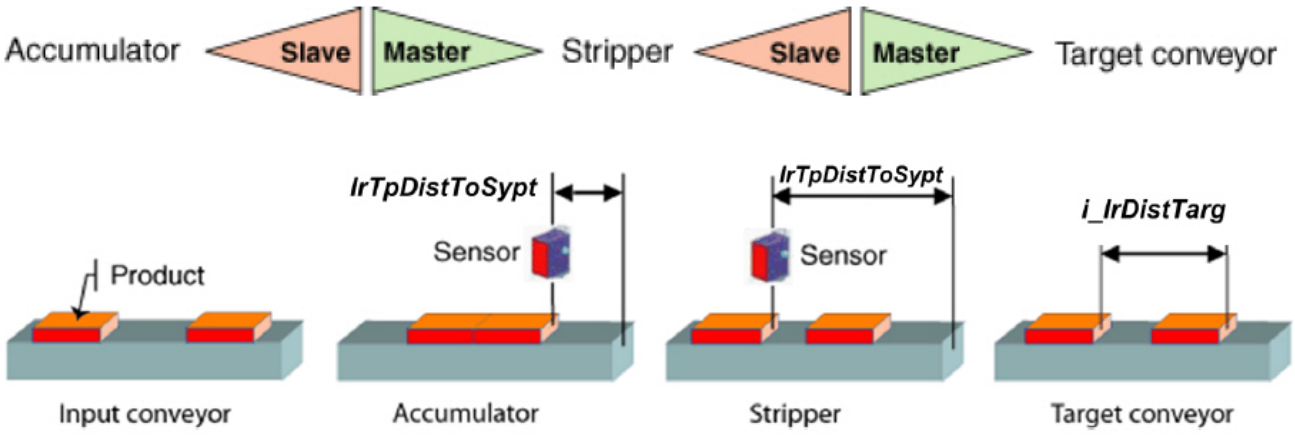
Appropriate function blocks allow a storing and a subsequent delivery of products. A desired distance between the products can be set and be modified at each cycle.

The Grouping function blocks can be used separately or together. In combination they form an unsteady product flow into an evenly spaced product flow. This introduces the concept of master and slave.

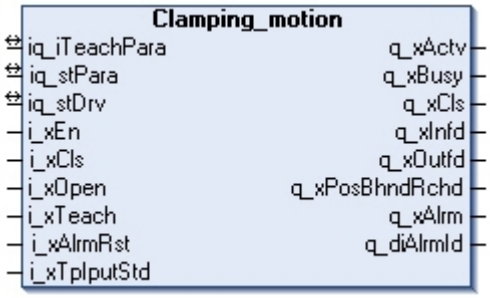
GroupingAccumulator_Motion



GroupingStripper_Motion



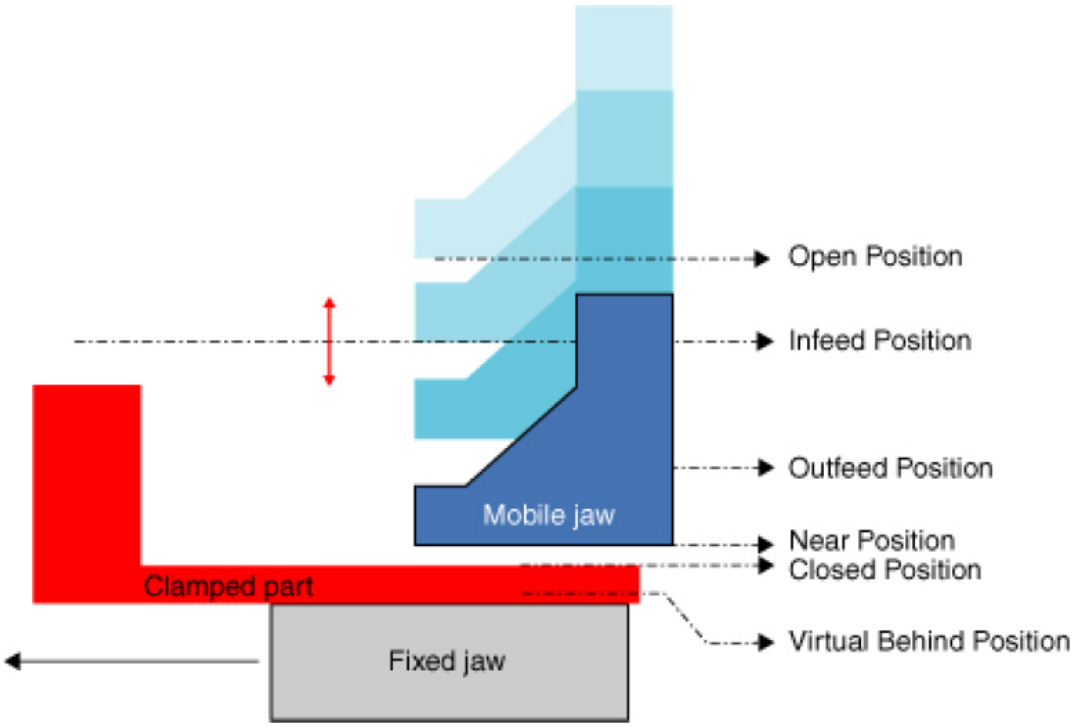
Clamping_Motion



The Clamping_Motion function block is required for clamping arbitrary products.

When i_xCls is activated, the clamping starts a fast positioning up to a defined position or until the recognition of an input signal. After this, the axis brakes and continues driving slowly until a set reference current or the goal position is reached. With the signal i_xOpen, the clamping returns to a specified position.

Note: The closing movement must be in positive direction of the drive.



Detailed Component List

The following is a bill of materials for the main components of the Performance CANmotion LMC058 architecture. The complete bill of materials of the overall architecture can be found in the EPLAN file "Performance_CANmotion_LMC058_WID.pdf"

Mains Switch

Hardware-Components				
Pos.	**Qty**	**Description**	**Part Number**	**Rev./ Vers.**
1.1	1	Main switch 3pin 36 kA	LV429003	
1.2	1	Contact block TM16D	LV429035	
1.3	1	Terminal cover	LV429321	
1.4	1	Rotary drive with door interface	LV429340	

Emergency Stop

Hardware-Components				
Pos.	**Qty**	**Description**	**Part Number**	**Rev./ Vers.**
2.1	1	E-Stop safety module XPS AC	XPSAC5121	
2.2	1	E-Stop safety extension module	XPSAV31113Z002	
2.3	1	E-Stop pushbutton for cabinet door	XB5AS844	
2.4	1	E-Stop pushbutton for field	XALK178G	
2.5	4	Illuminated pushbutton, 1NC, blue	XB5AW36B5	
2.6	2	Assembly housing 1 cut-out	XALD01	
2.7	4	Contactors	LC1D09BD	

Door Guard

Hardware-Components				
Pos.	**Qty**	**Description**	**Part Number**	**Rev./ Vers.**
3.1	1	E-Stop safety module XPS AC	XPSECP5131	
3.2	1	Door guard switch	XCSA502	
3.3	1	Door guard switch	XCSPA792	
3.4	1	Actuator for door guard switch	XCSZ02	
3.5	1	Actuator for door guard switch	XCSZ12	
3.6	11	Contactors	LC1D09BL	

Display and Indicators

Hardware-Components				
Pos.	**Qty**	**Description**	**Part Number**	**Rev./ Vers.**
4.1	1	Assembly housing 3 cut-outs	XALD03	
4.2	2	Pushbutton, green	XB5AA31	
4.3	3	Pushbutton, red	XB5AA42	
4.4	2	Illuminated pushbutton, 1 NC, green	XB5AW33B5	
4.5	2	Illuminated pushbutton, 1 NC, yellow	XB5AW35B5	
4.6	1	Aluminum tube for tower light	XVBC02	
4.7	1	Fixing plate for tower light	XVBC11	
4.8	1	Base unit for tower light	XVBC21	
4.9	1	Signal element green	XVBC2B3	
4.10	1	Signal element red	XVBC2B4	
4.11	1	Signal element blue	XVBC2B6	
4.12	1	Signal element clear	XVBC2B7	

Automation Components

Hardware-Components				
Pos.	**Qty**	**Description**	**Part Number**	**Rev./ Vers.**
5.1	1	Modicon LMC058 Motion controller	LMC058LF424S0	V2.0.0.35
5.2	3	Digital input module; 12 DI	TM5SDI12D	
5.3	1	Digital output module; 12 DO	TM5SDO12T	
5.4	1	Analog input module; 2 AI	TM5SAI2L	
5.5	1	Pt100/Pt1000 input module; 4 AI	TM5SAI4PH	
5.6	1	Analog output module; 4 AO	TM5SAO4L	
5.7	8	Terminal block, 12 pin coded	TM5ACTB12	
5.8	1	Locking plate right	TM5ACLPR1	
5.9	7	Base module for extension slices	TM5ACBM11	
5.10	1	Power module	TM5SPS2F	
5.11	1	Base module for power slices	TM5ACBM01R	
5.12	1	Advantys OTB CANopen module	OTB1C0DM9LP	V2.20
5.13	1	Advantys OTB digital input module; 8 DI	TM2DDI8DT	
5.14	1	Advantys OTB digital output module; 8 DO	TM2DRA8RT	

Magelis HMI

Hardware-Components				
Pos.	**Qty**	**Description**	**Part Number**	**Rev./ Vers.**
6.1	1	Magelis 10.4" Touch screen graphic terminal	XBTGT5330	V5.1.0.272

Power supply and Heating relay

Hardware-Components				
Pos.	**Qty**	**Description**	**Part Number**	**Rev./ Vers.**
7.1	2	Power supply 230 Vac / 24 Vdc, 10 A	ABL8RPS24100	
7.2	3	Power supply 230 Vac / 24 Vdc, 5 A	ABL8RPS24050	
7.3	2	Disconnect terminal	5711016550	
7.4	2	Pilot light white	XB5AVB1	
7.5	4	Solid state relays for heating	SSRPCDS10A1	
7.6	2	Circuit Breaker C60N 1P, C, 2 A	23726	
7.7	4	Circuit Breaker C60N 1P, C, 10 A	23734	
7.8	2	Circuit Breaker C60N 2P, C, 2 A	23747	
7.9	2	Circuit Breaker C60N 2P, C, 10 A	23756	
7.10	2	Circuit Breaker C60N 3P, C, 10 A	23773	
7.11	3	Circuit Breaker C60N 2P, C, 2 A	24443	
7.12	2	Circuit Breaker C60N 2P, C, 3 A	24444	
7.13	1	Circuit Breaker C60H 1P, C2, 2 A	25021	
7.14	2	Circuit Breaker C60L 1P, D, 10 A	25085	
7.15	2	Circuit Breaker C60L 1P, C, 1 A	25392	
7.16	5	Circuit Breaker C60L 1P, C, 2 A	25393	
7.17	1	Circuit Breaker C60L 1P, C, 4 A	25395	
7.18	4	Circuit Breaker C60L 2P, C, 2 A	25419	
7.19	1	Circuit Breaker C60L 1P, Z, 1 A	26133	
7.20	2	Circuit Breaker C60L 1P, Z, 2 A	26135	
7.21	2	Circuit Breaker C60L 2P, Z, 10 A	26161	
7.22	8	Auxiliary contacts for C60N	26924	
7.23	5	Terminal with LED for micro fuse	AB1FUSE435U5XB	
7.24	4	Fuse 1 A, slow-blow (third party)	0218001.HXP (Littelfuse)	
7.25	2	Fuse 3.15 A, slow-blow (third party)	02183.15HXP (Littelfuse)	
7.26	4	Fuse 6.3 A, slow-blow (third party)	021806.3HXP (Littelfuse)	

Drives and Power

Hardware-Components				
Pos.	**Qty**	**Description**	**Part Number**	**Rev./ Vers.**
8.1	4	Lexium 32 servo drive	LXM32AD18M2	V1.03.20
8.2	2	Servo motor with brake	BMH0702T02F2A	
8.3	2	Servo motor with brake	BSH0702P02F2A	
8.4	4	Power cable for Lexium 32; 5 m	VW3M5101R50	
8.5	4	Encoder cable for Lexium 32; 5 m	VW3M8102R50	
8.6	2	Lexium SD3 stepper drive	SD328AU25S2	V1.502
8.7	2	Stepper motor	BRS397W261ACA	
8.8	2	Power cable for Lexium SD3; 5 m	VW3S5101R50	
8.9	2	Encoder cable for Lexium SD3; 5 m	VW3S8101R50	
8.10	2	Altivar 71 variable speed drive; 0.75 kW	ATV71H075N4	V3.3 IE40
8.11	2	Altivar 312 variable speed drive; 0.75 kW	ATV312H075N4	V5.1 IE50
8.12	4	Altivar 312 variable speed drive; 0.37 kW	ATV312H037N4	V5.1 IE50
8.13	1	Lexium ILA integrated drive	ILA1F571PC2A	
8.14	1	Lexium ILE integrated drive	ILE1F661PC1A1	
8.15	2	Power cable for Lexium ILx; 5 m	VW3L30001R50	
8.16	2	I/O signal inserts with safety function	VW3L40420	
8.17	4	Connector kit for 2 I/Os	VW3L50200	
8.18	2	Cable for safety function	VW3L30010R50	
8.19	1	TeSysU base module reversing; 12 A	LU2B12BL	
8.20	1	TeSysU coil wiring kit	LU9MRL	
8.21	1	TeSysU control unit; standard 1,25...5A	LUCA05BL	
8.22	1	TeSysU CANopen module	LULC08	
8.23	4	Magnetic circuit breaker; 2.5 A	GV2L07	
8.24	4	Magnetic circuit breaker; 4.0 A	GV2L08	
8.25	4	Magnetic circuit breaker; 6.3 A	GV2L10	
8.26	2	Magnetic circuit breaker; 10 A	GV2L14	
8.27	14	Auxiliary contacts for circuit breaker; 1 NO, 1 NC	GVAE11	

Sensors

Hardware-Components				
Pos.	**Qty**	**Description**	**Part Number**	**Rev./ Vers.**
9.1	1	Inductive proximity sensor pre-cabled 2 m (optional for Analog Tension Control)	XS4P12AB120	
9.2	2	Inductive proximity sensor pre-cabled 2 m (optional for Digital Tension Control)	XS612B1PAL2	
9.3	4	Inductive proximity sensor with M8 connector (optional for Pick and Place)	XS508B1PBM8	
9.4	4	Sensor cable M8, 5 m (optional for Pick and Place)	XZCP0166L5	
9.5	7	Fixing bracket for proximity sensor (optional packaging machine sensors)	XSZB108	
9.6	2	Photo-electric sensor with M8 connector (optional Lateral Position Control)	XUYFANEP40015	
9.7	2	Sensor cable M8, 5 m (optional Lateral Position Control)	XCZP0941L5	
9.8	1	Inductive Proximity sensor with M8 connector (optional for generic purposes)	XS608B1PAM12	
9.9	1	Sensor cable M12, 2 m (optional for Inductive Proximity sensor)	XZCP1264L2	
9.10	1	Photoelectric sensor with M12 connector (optional for generic purposes)	XUB1APANM12	
9.11	1	Sensor cable M12, 2 m (optional for Photoelectric sensor)	XZCP1264L2	
9.12	1	Reflector 50 x 50 (optional for Photoelectric sensor)	XUZC50	
9.13	4	Sensor for Temperature measurement Pt100	PT46X150 (Labfacility)	

Encoder

Hardware-Components				
Pos.	**Qty**	**Description**	**Part Number**	**Rev./ Vers.**
10.1	1	CANopen multi-turn absolute encoder	XCC3510PS84CB	
10.2	1	Absolute multi-turn encoder	XCC3510PS84SGN	
10.3	3	Cable for absolute multi-turn encoder; 5 m	XCCPM23122L5	
10.4	2	Incremental encoder; 5 Vdc, RS422	XCC1510PS11X	
10.5	2	Encoder interface card for ATV71; 5 Vdc, RS422	VW3A3401	
10.6	3	Cable for incremental encoder; 5 m	XCCPM23121L5	
10.7	4	Encoder fixing bracket	XCCRE5SN	
10.8	1	Encoder cable at controller	VW3M4701	

CANopen and Ethernet

Hardware-Components				
Pos.	**Qty**	**Description**	**Part Number**	**Rev./ Vers.**
11.1	2	CANopen RJ45 connector (daisy chain)	TCSCTN023F13M03	
11.2	1	CANopen RJ45 terminator	TCSCAR01NM120	
11.3	3	CANopen tap with 4 x SubD9	TSXCANTDM4	
11.4	8	CANopen cable SubD9 - RJ45; 1 m	TCSCCN4F3M1T	
11.5	3	CANopen cable SubD9 - SubD9; 1 m	TSXCANCADD1	
11.6	4	CANopen cable RJ45 - RJ45; 0.3 m	VW3CANCARR03	
11.7	1	CANopen cable; 50 m	TSXCANCD50	
11.8	2	CANopen cable 2 x M12; 2 m	FTXCN3220	
11.9	1	CANopen cable 2 x M12; 5 m	FTXCN3250	
11.10	1	CANopen M12 terminator	FTXCNTL12	
11.11	1	CANopen cable M12 male – open end; 5 m	1525652 (Phoenix)	
11.12	2	CANopen cable M12 female – open end; 5 m	1525704 (Phoenix)	
11.13	1	Ethernet 5 port switch	TCSESU053FN0	
11.14	2	Ethernet cable; 2 m	490NTW00002	
11.15	1	Ethernet cable; 5 m	490NTW00005	

Sarel cabinet

Hardware-Components				
Pos.	**Qty**	**Description**	**Part Number**	**Rev./ Vers.**
12.1	1	Enclosure with mounting plate (1800 x 1200 x 600 mm)	NSYSF1812602DP	
12.2	1	Set of two side wall (1800 x 600 mm)	NSY2SP186	
12.3	1	Enclosure with mounting plate (600 x 800 x 400 mm)	NSYS3D8640P	
12.4	2	cabinet light incl. socket; magnetic fixing	NSYLAM75	
12.5	1	Wiring diagram pocket	NSYSDP8M	
12.6	2	Thermostat; 1 NC, 0...60 °C	NSYCCOTHO	
12.7	1	Fan with filter; 56 m³, 230 Vac	NSYCVF85M230PF	
12.8	1	Fan with filter; 250 m³; 230 Vac	NSYCVF165M230PF	
12.9	1	Cabinet filter; 56 m³	NSYCAG125LPF	
12.10	1	Cabinet filter; 250 m³	NSYCAG223LPF	

Software Tools

Software-Components				
Pos.	**Qty**	**Description**	**Part Number**	**Rev./ Vers.**
13.1	1	SoMachine (Includes Vijeo Designer)	MSDCHNSFUV20	V2.0
13.2	1	SoMachine Solution Extension	MSDCHNSFUS0V20	V2.0
13.3	1	Advantys Configuration Software	STBSPU1000	V4.8
13.4	1	Programming cable	TCSXCNAMUM3P	

Component Protection Classes

Positioning Protection Class	Component	In Field, On Site			Cabinet		
					Front		Inside
		IP54	IP65	IP67	IP55	IP65	IP20
	Main Switch						**X**
	Emergency Stop switch housing XALK		**X**				
	Preventa safety module XPS						**X**
	Single/Double switch housing		**X**				
	Control switch, 3 positions					**X**	
	Indicator buttons		**X**				
	Buttons with LED + 1 switch(1S)						**X**
	Positions switch Universal		**X**				
	Contactors						**X**
	Phaseo Power Supply						**X**
	Modicon LMC058 Motion controller						**X**
	Altivar 312 and Altivar 71						**X**
	Lexium 32 servo drive						**X**
	BSH and BMH Servo motors		**X** shaft end IP40				
	Advantys OTB						**X**
	TeSys contactor						**X**
	Magelis XBTGT HMI					**X**	**X**

Environmental Characteristics

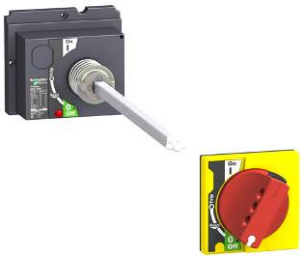
NOTE: The equipment represented in the architecture(s) of this document has been rigorously tested to meet the individually specified environmental characteristics for operation and storage, and that information is available in the product catalogs. If your application requirements are extreme or otherwise do not appear to correspond to the catalog information, your local Schneider Electric Support will be eager to assist you in determining what is appropriate for your particular application needs.

Component Features

Components

Compact NSX main switch

Compact NSX rotary switch disconnectors from 12 to 175 A are suitable for on-load making and breaking of resistive or mixed resistive and inductive circuits where frequent operation is required. They can also be used for direct switching of motors in utilization categories AC-3 and DC-3 specific to motors.



- 3-pole rotary switch disconnectors, 12 to 175 A
- Padlockable operating handle (padlocks not supplied)
- Degree of protection IP 65

Power Supply Phaseo: ABL8RPS24100 & ABL8RPS24050

- Single or two phase connection
- 100...120 Vac and 200...500 Vac input
- 24 Vdc output
- Diagnostic relay
- Protected against overload and short circuits

Altivar 312 Variable Speed Drive

The Altivar 312 drive is a variable speed drive for 3-phase squirrel cage asynchronous motors. The Altivar 312 is robust, compact, easy to use and conforms to EN 50190, IEC/EN 61800-2, IEC/EN 61800-3 standards UL/CSA certification and to CE marking.

Altivar 312 drives communicate on Modbus and CANopen industrial buses. These two protocols are integrated as standard.

Altivar 312 drives are supplied with a heat sink for normal environments and ventilated enclosures. Multiple units can be mounted side by side to save space.

Drives are available for motor ratings between 0.18 kW and 15 kW, with four types of power supply:

- 200 Vac to 240 Vac 1- phase, 0.18 kW to 2.2 kW
- 200 Vac to 240 Vac 3-phase, 0.18 kW to 15 kW
- 380 Vac to 500 Vac 3-phase, 0.37 kW to 15 kW
- 525 Vac to 600 Vac 3-phase, 0.75 kW to 15 kW

Altivar 71 Variable Speed Drive

- - 200 Vac to 240 Vac 1-phase, 0.37 kW to 7.5 kW
  - 200 Vac to 240 Vac 3-phase, 0.37 kW to 75 kW
  - 380 Vac to 480 Vac 3-phase, 0.75 kW to 500 kW
  - 500 Vac to 690 Vac 3-phase, 2.2 kW to 630 kW
- Integrated EMC filter
- Temperature range: -10 to +50°C
- Speed range 0 to 1000 Hz
- Graphical display for control and parameterization
- Operation via Modbus, CANopen or other buses possible
- 2 analog inputs plus 1 analog output
- Digital inputs, 2 digital status outputs
- 1 shutdown output (Power removal function)
- Option cards for communication buses, Extended I/O and encoder
- Protections of drive and motor
- Compact design, side-by-side installation possible

Lexium 32 servo drive

- Voltage range:

1-phase 100 – 120 Vac or 200 – 240 Vac
3-phase 200 – 240 Vac or 380 – 480 Vac

- Power: 0.4 to 6 kW
- Rated torque: 0.5 to 36 Nm
- Rated speed: 1500 to 8000 RPM
- The compact design allows for space-saving installation of the drive in control cabinets or machines.
- Features the "Power Removal" (Safe Stop) functional safety function, which prevents the motor from being started accidentally. Category 3 with machine standard EN 954-1
- Lexium 32 servo amplifiers are fitted with a brake resistor as standard (an external brake resistor is optional)
- Quick control loop scan time: 62.5 µs for current control loop, 250 µs for speed control loop and 250 µs for position control loop
- Operating modes: Point-to-point positioning (relative and absolute), electronic gears, speed profile, speed control and manual operation for straightforward setup.
- Logic inputs and outputs
- Analog reference inputs with ± 10 Vdc
- Control interfaces: CANopen, Modbus or Profibus DP

Lexium Integrated Drive ILE with Brushless DC Motor

The specialist for flexibility

- 3-phase synchronous motor with electronic commutation (brushless DC motor)
- High detent torque eliminates the need for a holding brake in many cases
- Electronics offer the facility of absolute position feedback
- Perfect for automatic format adjustments

Torque: 3.1 Nm to 11 Nm with spurwheel gear; 0.26 Nm (without gear)
Speed: 4900 RPM (without gear); 35 RPM to 270 RPM with spurwheel gear
Positioning resolution: 0.26° to 1.667° (with gear 115:1, 18:1)
Holding torque: 1 Nm to 8 Nm with spurwheel gear
Fieldbus interface: CANopen, DeviceNet, RS 485, PROFIBUS DP, Ethernet Powerlink, EtherCAT, Modbus–TCP
Operating modes: Homing, profile position, profile velocity
Configuration: Baud rate, network address and terminating resistor via DIP switch; four configurable inputs/outputs (e.g. as limit switch or stop input)
Safety function: "Safe Torque Off" as per IEC/EN 61800-5-2 and performance level “d” (PLd) according to ISO 13849-1.
Options and accessories: Spurwheel gear or planetary gear for optimum tuning to application requirements, connection accessories

Lexium Integrated Drive ILA with Servo Motor

The specialist for dynamics

- With AC synchronous servo motor
- Superior dynamics due to high torque during acceleration
- Various winding types for adaptation to application-specific requirements
- Closed-loop drive system with high-resolution encoder

Torque: 0.25 Nm to 0.66 Nm
Peak torque: 0.43 Nm to 1.26 Nm
Speed: Up to 9000 RPM (without gear)
Positioning resolution: 0.022°
Fieldbus interface: CANopen, DeviceNet, RS 485, PROFIBUS DP, Ethernet Powerlink, EtherCAT, Modbus–TCP
Operating modes: Homing, profile position, profile velocity, electronics gear
Configuration: Baud rate, network address and terminating resistor via DIP switch; four configurable inputs/outputs (e.g. as limit switch or stop input)
Safety function: "Safe Torque Off" as per IEC/EN 61800-5-2 and performance level “d” (PLd) according to ISO 13849-1.
Options and accessories: Planetary gear, absolute encoder, holding brake and connection accessories

Stepper Drive Lexium SD3

Lexium Stepper Motor Drives SD3 offer quality in a package: a compact drive plus a high-accuracy motor.
Reference values are typically preset and monitored by a Schneider Electric motion controller.
In most cases, a gearbox is not required due to the high torque.
The SD3 drive and the sinusoidal commutation of the motors enable almost completely resonance-free operation.
With its small footprint (72 mm wide, 145 mm high and 140 mm deep), SD3 requires very little space in the control cabinet.
The drives are available up to 6.8 A.
SD3 are suitable for mains supply with 1~115 Vac and 230 Vac (50/60 Hz) and feature a 5 V and a 24 V pulse/direction interface
or fieldbus interfaces (CANopen, CANmotion and Modbus).
The mains filter is integrated and current at standstill is reduced automatically.

Modicon LMC058 Motion controller LMC058LF424S0

The Motion controller Modicon LMC058 is the solution for axis control and positioning, including automation functions.
The expandability is based on Schneider Electric "Flexible Machine Control" concept.
This motion controller is designed for machine manufacturers (OEMs) who require synchronized axes.

The LMC058 master motion controller includes as standard:

- 42 digital I/O: 26 inputs and 16 outputs
- 4 analog I/O: 4 inputs
- 1 RJ45 port: Ethernet
- 1 SUB-D port (9-way male): CANopen master
- 1 SUB-D port (9-way male): CANmotion master
  Synchronized axis: up to 8 axes
  Performance: 4 synchronized axis in 2 ms
- 1 SUB-D port (15-way female): master encoder (incremental or SSI)
- 1 USB-A port: program transfer
- 1 USB-B mini-port: software programming
- 1 RJ45 port: RS232/RS485 serial link
- + 2 free PCI slots for optional communication modules

Advanced features :

- Master encoders Master/slaves
- Virtual Axis
- Capture Input / Reflex outputs (4)
- Expandable digital or analog compact or slice inputs /outputs modules.

Preventa safety module: XPSAC5121

Main technical characteristics:

For monitoring	Emergency Stop
Max. Category accord. EN 954-1	3
No. of safety circuits	3 N/O
No. of additional circuits	1 Solid-State
Indicators	2 LED
Power supply AC/DC	24 V
Response time on input opening	< 100 ms
AC-15 breaking capacity	C300
DC-13 breaking capacity	24 Vdc / 2 A - L/R 50ms
Minimum voltage and current	17 V / 10 mA
Dimensions (mm)	114 x 22.5 x 99
Connection	Captive screw-clamp terminals
Degree of protection	IP20 (terminals) IP40 (casing)

Safety modules XPS AC are used for monitoring Emergency Stop circuits conforming to standards EN ISO 13850 and EN 60204-1 and also meet the safety requirements for the electrical monitoring of switches in protection devices conforming to standard EN 1088 , ISO 14119. They provide protection for both the machine operator and the machine by immediately stopping the dangerous movement on receipt of a stop instruction from the operator, or on detection of a fault in the safety circuit itself.

Magelis Display Terminal: XBTGT5330

- Sensor screen (STN-Technology) with 24 Vdc power supply
- Brightness and Contrast adjustment
- Communication via Uni-Telway and Modbus. Communication via Ethernet TCP/IP is also available in specific models
- Flat Profile
- Memory expansion for application program
- Temperature range: 0..+ 50 °C
- Certificates: UL, CSA

SoMachine OEM Machine Programming Software: MSDCHNSFUV20 and MSDCHNSFUS0V20

SoMachine is the OEM solution software for developing, configuring and commissioning the entire machine in a single software environment, including logic, motion control, HMI and related network automation functions.

SoMachine allows you to program and commission all the elements in Schneider Electric's Flexible and Scalable Control platform, the comprehensive solution-oriented offer for OEMs, which helps you achieve the most optimized control solution for each machine's requirements.

Flexible and Scalable Control platforms include:

Controllers:

HMI controllers:
- Magelis XBTGC HMI controller
- Magelis XBTGT HMI controller
- Magelis XBTGK HMI controller

Logic controllers:
- Modicon M238 Logic controller
- Modicon M258 Logic controller

Motion controller
- Modicon LMC058 Motion controller

Drive controller:
- Altivar ATV-IMC Drive controller

HMI:

HMI Magelis graphic panels:
- XBTGT
- XBTGK

SoMachine is a professional, efficient, and open software solution integrating Vijeo Designer.
It integrates also the configuring and commissioning tool for motion control devices.

It features all IEC 61131-3 languages, integrated fieldbus configurators, expert diagnostics and debugging, as well as outstanding capabilities for maintenance and visualization.

SoMachine integrates tested, validated, documented and supported expert application libraries dedicated to Packaging, Hoisting and Conveying applications.

SoMachine provides you:
- One software package
- One project file
- One cable connection
- One download operation

Advantys Configuration Software STBSPU1000

Software to configure the Advantys OTB, (STB, FTB and FTM).

- Parameterize all the I/O modules of the Advantys OTB platform (digital, analog and intelligent modules) with standard functions.
- Generating of export EDS files for SoMachine

Contact

Publisher	**Process & Machine Business** **OEM Application & Customer Satisfaction** Schneider Electric Automation GmbH Steinheimer Strasse 117 D - 63500 Seligenstadt Germany
Homepage	http://www.schneider-electric.com/sites/corporate/en/home.page
As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication**.**	